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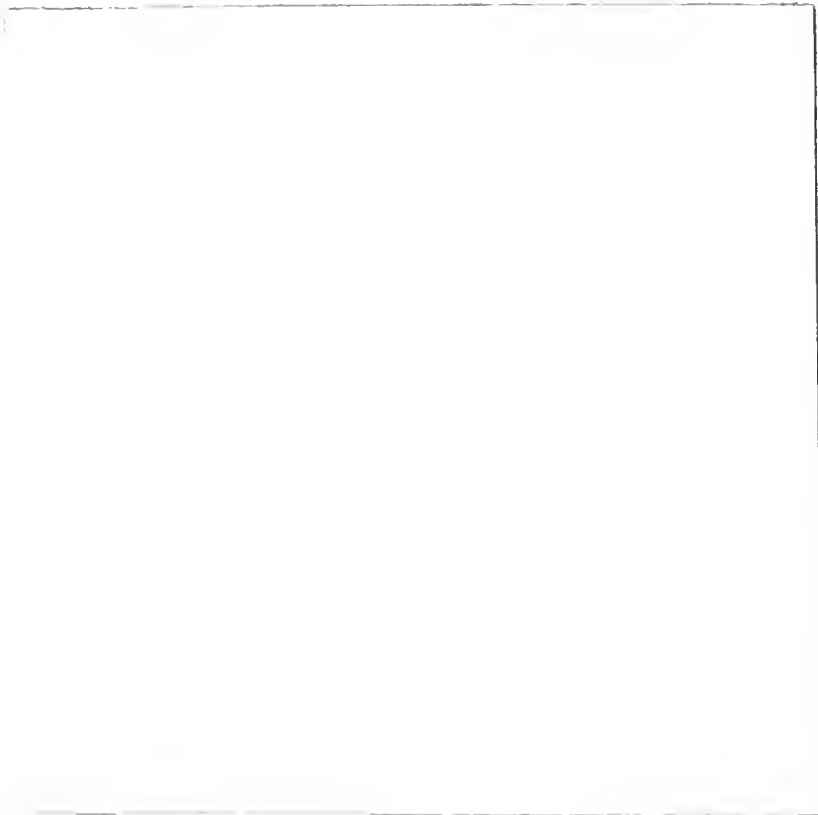
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Forest Journal

MONTANA

RESOURCES AND OPPORTUNITIES EDITION

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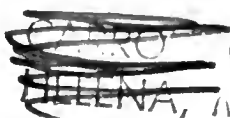
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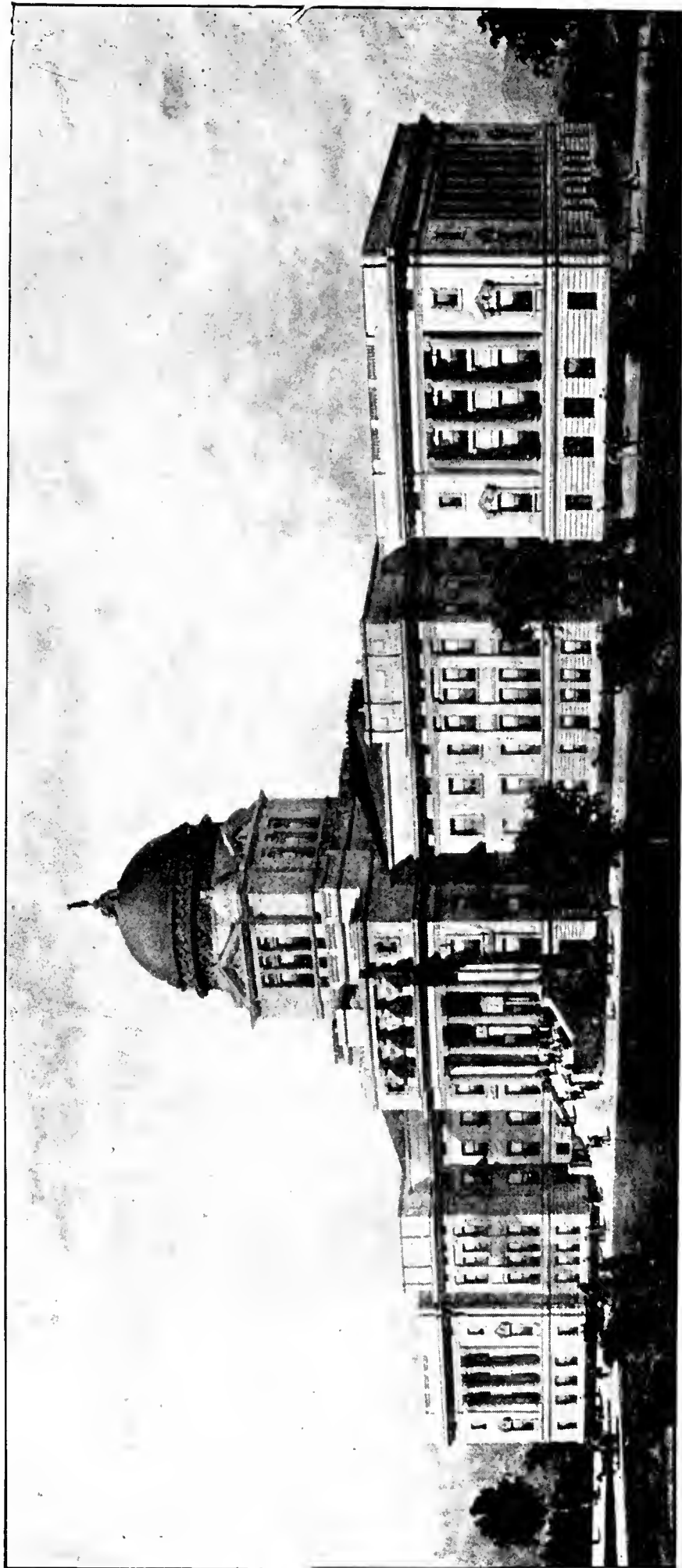
JUNE, 1926

Published Six Times a Year

HELENA

MONTANA





THE MONTANA STATE CAPITOL, BUILT OF MONTANA STONE.



FOREWORD

The primary purpose of this publication is to furnish readable facts about Montana for the thoughtful prospective citizen looking toward this Commonwealth as a place of residence; and to those who seek a field for profitable investment. Second: It is thought the book will be found of use to Montanans in placing before our own people a compact up-to-date story of the State.

The truth is good enough about Montana. Care has been taken to present in simple language only the truth, in the sincere belief that the greatest service that can be rendered this state in the work of publicity is to gather and assemble the facts in plain words. It has been the aim in these pages to set forth information of practical value to the man of moderate means who seeks to improve his condition and to give a better chance to his children than may be found in some of the more congested districts of the Republic.

"Montana," published by the Division of Publicity, Department of Agriculture, Labor and Industry, is to be issued six times each year. Later editions will be much smaller and will be largely statistical. It is hoped that this edition will become a standard authority on Montana and that it may be used in the schools and colleges of this and other states as a textbook.

No claim of originality is advanced. The matter here presented has already been previously prepared eleven times. From the newspapers and magazines, from earlier editions, "copy" has been shamelessly and boldly "lifted."

Credit then for the volume largely belongs to the former Commissioners of Agriculture and Chiefs of the Publicity Division, and especially to the late J. M. Kennedy and J. H. Hall, to Seth Maxwell, Charles D. Greenfield, Charles D. Greenfield, Jr., and L. A. Campbell; to the newspapers of Montana, and especially to E. G. Leipheimer of the Anaconda Standard, Byron Cooney of the Montana American, W. E. Lowell of the Associated Press, J. Burke Clements of the Helena Independent, Floyd Smith of the Record-Herald, Warren Moses of the Great Falls Tribune; to the United States Department of Agriculture, and especially to J. G. Diamond, who has prepared all statistics and much of the text relating to farms and livestock; to the secretaries of the chambers of commerce; to the state and county officials; to the officials of the transportation companies and especially to W. P. Stapleton and H. W. Byrty of the Northern Pacific, and E. C. Leedy of the Great Northern and Wm. Hunter of the Chicago, Milwaukee and St. Paul; to many public spirited citizens of the state, and especially to W. C. Towne, Daniel Whetstone, and Dr. J. P. Rowe—but it would be impossible to mention all who have contributed to the volume. Almost one hundred citizens have assisted. If the book has merit, they are entitled to the credit.

The Division of Publicity for the Department of Agriculture, Labor and Industry is, in a measure, a clearing house of information for the entire state. Its services are placed at the disposal of any one who wishes information concerning Montana, and it will be glad to answer inquiries on the subject.

BARCLAY CRAIGHEAD,

Helena, Montana.

Labor, Publicity and Real Estate Division,
Department of Agriculture, Labor and Industry.

Montana Needs the New Settler



JOHN E. ERICKSON
Governor of Montana.

MONTANA is today calling for men; high-hearted men of intelligence and industry in search of opportunity. We have no place for the ne'er-do-well, the land hog or the speculator.

Montana needs the settler and the homebuilder. We have passed through the pioneer period of exploration. The past few years have been years of experimentation. We now know what we can do. The history of the older states is here being repeated. Montana's crops in 1925 were harvested from 6,000,000 acres. Failures were reported from less than five per cent of our acreage. We have 6,000,000 acres of land in this state that can, with reasonable expenditures, be irrigated. We have five times 6,000,000 acres of farming lands. Last year each acre of land under the plow produced an average of \$20. With 30,000,000 acres under cultivation at the same ratio of production, our crops alone would bring to this state not less than \$600,000,000. But we are learning how to farm. We are learning to make farming more profitable, and with the increase of our acreage will come increase in production and increase in proceeds.

The development of these vast agricultural resources will mean great commercial and industrial centers in Montana. It will mean increased payrolls, home markets and diversified industries. In short, it will mean a great, wealthy and prosperous state.

To the industrious citizen, Montana offers a share in the rewards of future development.

—JOHN E. ERICKSON.

MONTANA'S ROMANTIC HISTORY



First White Men to Set Foot on Montana Soil—Jefferson Buys Montana from Napoleon—Early Development Slow.



On a crisp, sparkling New Year's day in 1743, a travel wearied little group of fur traders and explorers urged on their worn steeds in what is now South-eastern Montana. All day they pressed westward. As the sun hung low, silhouetting long shadowy forms at their backs, to the west they beheld a marvelous scene—a sunset in the Big Horn range of the Rocky Mountains. Peak after peak banked high, one topping the other. Covered with snow, glistening and painted rosy-hued by a dying sun, the view brought to the lips of their leader the graphic metaphor, "This is the land of Shining Mountains." The expression has clung to Montana for almost two centuries.

First White Men in Montana.

The leader of the party was Chevalier De La Verendrye, 35 years of age. Thus to the Verendryes, Frenchmen, hunters, fur traders, explorers, belongs the honor of being the first white men to set foot on Montana soil.

On the 29th of April, 1742, the party left the Canadian Lake of the Woods. The journey of several thousand miles to southeastern Montana was achieved against terrific odds. On the return trip, May 2, 1744, Verendrye raised a monument on an eminence on the Missouri near what is now Pierre, South Dakota, and planted a leaden plate bearing the date and the arms of France.

Schoolboys Find Plate.

A hundred and fifty years later, schoolboys found the plate. It is now the property of the South Dakota Historical Society, and is reproduced on this page by permission of the Society.

As a result of the exploration of Verendrye and others, Montana, in common with all the states of the Union included in the Louisiana purchase, was a province of France and became a pawn of the European powers. At the beginning of the nineteenth century, Great Britain and France had long been at death grips for world empire. Clashing national ambitions, religious antagonisms, dynastic feuds,

The Verendrye Plate

Translation: "Placed by the Chevalier de La Verendrye, Louis Joseph (his brother) Long La Londette, A Motte, (two employees) the 30th of March, 1743."

POSE PAR LE
CHEVALIER DE LA
VERENDRYE
T6 ff Louysa Londette
A motte
/e30 d mar 1743



Lewis and Clark.

all played a part in bringing on and continuing the struggle. The battle royal was waged on land and sea, by statesmen and by warriors, by money and by arms.

In the struggle the impotent Bourbon rulers of France lost Montana to England; Napoleon determined to have it back. In 1800, as one of the first fruits of victory, he got it—with all of Louisiana—an imperial domain out of which fourteen of the best states of the Union have been carved.

In 1803 war between France and England again breaking out, Napoleon

sold Montana, with the other states included in the Louisiana purchase, to the United States. The deal was consummated by the statesmanship of Thomas Jefferson. When Jefferson took office, the United States was hemmed in by the Mississippi and the Atlantic; by a sweep of the pen he flung our frontiers toward the sunset; he did not rest until the feet of his explorers had officially touched the western sea, for an expedition was at once set on foot to open up to the knowledge of the world the mysterious regions of the west.

Lewis and Clark.

Starting from St. Louis, Lewis and Clark, both Virginians, crossed Montana in 1805, and made their way to where the Columbia River enters the Pacific. At a cost of \$2,500, the work of these explorers not only acquired knowledge of the Louisiana purchase, but laid the foundation to the American claim to the Oregon country.

Save for Thomas Jefferson, Montana might today be a part of Canada or a province of France; when Jefferson laid down his duties, Montana was a part of "history's grandest realm devoted to democracy."

The Fur Traders.

For fifty years development was slow. According to the record of the Montana Historical Society, Manuel Lisa in the fall and winter of 1807-8, established at the junction of the Yellowstone and the Big Horn River the first fur trading post in Montana. Two years later in April, 1810, Lisa promoted a second post, the first of importance in interior Montana, located at Three Forks.

In 1829 Kenneth McKenzie established a post at the mouth of the Yellowstone River. In 1831 the same company established a trading post below Fort Benton, known as Fort McKenzie. The present city of Fort Benton was established and built in 1846, by Alexander Culbertson, for the American Fur Company. With the fur traders came missionaries and explorers, but it was not until the discoveries of gold at Gold Creek, Bannack and Virginia City, 1858-65, that large numbers were attracted to Montana. It has been estimated that Montana produced \$211,000,000 in gold and silver previous to 1881. Copper mining then gained a foothold.

As a result of the increase of population caused by the gold discoveries, Montana became a territory in 1864, and gained statehood in 1889.

The last spike on the Northern Pacific, the first transcontinental road to span Montana, was driven at a point between Garrison and Gold Creek on Independence day, 1883.

The foregoing brief sketch of Montana's early romantic history will be slightly supplemented in the various chapters to follow in this volume, but Montana presents to the historical student a fascinating field; for the history of Montana has not yet been wholly written. The job, in part, awaits the right man or woman.

That the people of the State are interested in Montana history, is indicated by the following prepared by the librarian of the State Society which follows:

Historical Library.

The Historical Society of Montana was incorporated by an act of the first territorial legislative assembly, approved February 2, 1865, by the following persons: H. L. Hosmer, C. P. Higgins, John Owen, Granville Stuart, James Stuart, W. F. Sanders, Malcolm Clarke, F. M. Thompson, William Graham, W. W. DeLacy, C. E. Irvine and Charles S. Bagg. It was created, as stated in section one of the act, "in order to collect and arrange facts in regard to the early history of this territory, the discovery of its mines, incidents of the fur trade, etc."

First headquarters were at Virginia City, later Deer Lodge, and then Helena. In the disastrous fire of January 9, 1874, which swept the upper one-third of Helena, the valuable accumulations of the society were entirely destroyed. Undismayed, the officers and members set at work to restore the newspaper files, manuscripts, historical books, records and museum collections, and soon had a very respectable collection.

Later a room for collected material was secured in the Lewis and Clark county court house, and occupied for the first time July 5, 1887. In 1893 the property of the Historical Society came under the control of the state. By an act of the legislature, its management was placed under control of a board of five trustees, appointed by the Governor. On the completion of the State Capitol in 1902, the present quarters were occupied.

From a historical point of view, it is interesting to note that at the first meeting of the incorporators, held at Virginia City on April 20, 1865, the follow-



Looking Across Lame Deer Creek Into Soldier Gulch—The Battle Field Where General Miles and Lame Deer Fought.

ing officers were elected: President, Wilbur F. Sanders; vice-president, Granville Stuart; corresponding secretary, W. E. Cullen; recording secretary, Cornelius Hedges; librarian, Charles Rumley.

The library contains 40,000 rare books, many of which are now out of print, and nearly 4,000 volumes of bound newspaper files. The first four years of the Montana Post is complete, commencing on August 27, 1864, at Virginia City; also the practically complete files of the Helena Herald, Rocky Mountain Gazette, Helena Independent, Avant Courier, Rocky Mountain Husbandman, River Press and Fort Benton Record.

The library contains an accumulation of photographs, and manuscripts from pioneers, carefully filed away and indexed. On the walls are hung eighty splendid oil portraits of prominent pioneers, and many enlarged framed photographs.

The museum collection consists of thousands of relics, curios and one of the finest mineral collections in the country. This entire collection has not cost the state a dollar. It has been donated by interested pioneers from early territorial times. Hardly a day passes without some interesting material being sent to the library for preservation.

The expense of maintaining the library is borne by the state, by legislative appropriations. The present working force consists of David Hilger, librarian, and Mrs. Ann McDonnell, assistant librarian. The present board of trustees consists of James T. Stanfford of Great Falls, W. A. Hedges of Lewistown, Mrs. Josephine I. Hepner of Helena, M. J. Hutchens of Missoula, and David Hilger of Helena. The society has published nine volumes of contributions. They are of great value to the historical student. Volume ten is ready for the printer.

The collections of Indian photographs, manuscripts, curios and historical data, is one of the best in the northwest.

A cordial invitation to visit the library is extended to all visitors at the State Capitol.



Silent Sentinels of the Seventh, Battle of Little Big Horn.

Montana Geography

The plains, the valleys, the mountains, the waters, each constitute a part of Montana's greatness.

On the back cover of this volume will be found a map of the state. Prospective settlers are urged to study it and the other maps in this volume with care, and to read the following few pages of Montana geography. No one can hope to understand Montana without knowing a little of the geography of the State.

Montana is so big. Her resources are so varied. The State is in the infancy of development. Much has been accomplished; much more remains to be done.

The work of founding the commonwealth, clearing the way, proving the soil and making a start in the industries has been begun. The experiments of others will benefit those who now come.

Montana has the land and the resources to sustain a large population. There are mines waiting to be opened. There are new industries which are to be started. There are millions of acres of fertile soil which will provide homes and support for hundreds of thousands.

Montana has coal, and iron ore; limestone, and hydro-electric power. Steel is the inevitable heritage of the Treasure State. Some day the night will never be dark in this Commonwealth. Always in the sky will be the flicker of the furnaces of steel. Strong hard-handed sons of toil will sweat and wrestle with base molten metal as they now do with gold and silver and copper. No one can understand the Montana of today; or hope to roll back the curtains of the future for the most momentary glimpses of the Montana of tomorrow, without some knowledge of her geography and her people. This little book attempts in a brief way to visualize Montana as a whole. Hence, a few pages on her plains, her mountains, her waters, her valleys, and her climate follow.

Attention is also called to the chapter on the Counties of Montana, and the chapter on Fuel and Energy Resources.

THE SIZE OF MONTANA



Average Length East and West 535 Miles—Average Width North and South 275 Miles.



Montana—a Spanish word signifying mountainous—is of imperial proportions, a mammoth state of 94,078,080 acres.

It should always be remembered that Montana is big, in any consideration of its climate, its resources and its opportunities.

It is the third state in size in the Union, only Texas and California being larger; France and Germany are each only about one-third as large. England, Scotland, Wales and Ireland combined have fewer miles of territory; Montana embraces a greater area than all the New England states, New York, New Jersey, Delaware and Maryland added together.

Another table of comparison is in square miles. Montana has an area of 146,572 square miles, including a water surface of 770 square miles. Ohio, Illinois and Indiana combined contain 136,060 square miles; Kentucky, Tennessee and Georgia only 141,925.

Classification of Land.

About one-third of the total area of Montana has been designated as mountain land; the remaining two-thirds is divided equally between grazing and farming lands.

Location.

Montana is the keystone state of the great American Northwest. It lies between the 104th and 116th meridians of longitude west of Greenwich and between the 45th and 49th parallels of north latitude.



A Vacation Camp in the Forest.

THE MOUNTAIN AREA



*The Treasure Vault of the Treasure State—Mineral and Thermal Springs—
Grand and Picturesque Scenery—Many Prosperous
Valleys—Mining Operations.*



The melodious name Montana—selected as the name of the territory when it was created in 1864—is appropriate to one-third of the state, the mountain area, containing about 30,000,000 acres. But even the mountain area is interspersed with productive valleys in which are located some of the most prosperous cities of the State. The mountain area is the treasure vault of the Treasure State, in which are found gold, silver, lead, copper, coal, iron, manganese, marble, building stone, asbestos, corundum, petroleum; even precious stones, the sapphire, the ruby and the garnet. (See chapters in this volume on Mining in Montana and Fuel and Energy Resources.) In this region are found the great forests of Montana, one of the chief assets of the State. (See chapter on Lumbering in Montana).

In the mountains are many mineral and thermal springs whose waters are beneficial in the treatment of various diseases. Some of these are near railroad stations, have ample accommodations for visitors and are largely frequented. There are other springs which are remote from railroads and whose merits will become better known when improved transportation facilities permit easier access to them.

The mountains contain wood and water which are essential for mining operations and prospecting, great parks affording splendid pasturage for stock; they harbor the game the hunter and fisherman seek, and their grand and picturesque scenery appeals to lovers of the sublime and beautiful.

(See chapter on Recreational Resources.)



A Mountain Road in Game Country.

THE ALTITUDE OF MONTANA



Elevation Much Less Than Great Mountain Belt of Colorado, Wyoming, New Mexico and Nevada.



A fact not generally understood but of prime importance in its bearing on climate and consequently on crop production is that the elevation of both mountains and valleys in Montana is much less than that of the great mountain belt of Colorado, Wyoming, New Mexico, Utah and Nevada. The elevation of Santa Fe is 6,840 feet; of Denver, 5,300; of Salt Lake City, 4,350, and of Helena (near the base of the Continental Divide), 4,110 feet. The passes across the Rocky Mountains are also lower than in other states. The Northern Pacific Railway crosses the Continental Divide at Mullan Pass at an altitude of 5,547 feet. The Chicago, Milwaukee & St. Paul and the Great Northern cross at elevations not much higher.

The United States Geological Survey shows the average elevation of Montana above sea level to be 3,900 feet. Other states average: Nevada, 5,600 feet; Wyoming, 6,400 feet; Colorado, 7,000 feet. None of Utah and only 9,000 square miles of Colorado is below 4,000 feet, while 51,600 square miles of Montana are less than 4,000 feet and 40,700 square miles are less than 3,000 feet above sea level. "Taking the area of the state (Montana) as a whole," says U. S. Census Bulletin 153, "it has been ascertained that 49 per cent is under 5,000 feet above sea level; 21 per cent from 5,000 to 6,000 feet; 14 per cent from 6,000 to 7,000 feet; 9 per cent from 7,000 to 8,000 feet, and 7 per cent over 8,000 feet." The influence of altitude upon climate and crop production is too well known to need comment; but attention is especially invited to the figures which show how vast is the area of lands at a low altitude and to the fact that some of the most productive grain fields of the world are to be found in Montana at elevations greater than 5,000 feet.



Gateway to the Mountains—Prickly Pear Canyon.

WATER SUPPLY



At the Lowest Records in History, Montana Had Sufficient Water to Irrigate Ten Million Acres.



Montana is generously watered. The two great rivers of the United States have their source in Montana. They are the Missouri, which drains over two-thirds of the State, and the Columbia, which drains a large portion of western Montana. The Missouri is formed at Three Forks by the union of the Jefferson, Madison and Gallatin. It flows north, then east, through the central northern part of the state.

The western section of the State abounds in streams, which drain into the Kootenai and the Clark's Fork of the Columbia. A few are the Bitter Root, the Big Blackfoot, the Hellgate, the Missoula, the Deer Lodge and the Flathead.

Another large river is the Yellowstone, which has numerous affluents, the Powder, Tongue, Rosebud, Big Horn, Stillwater and Boulder, draining all the southeastern part of the State and carrying nearly as much water as the Missouri.

At the lowest water records in the history of the State there was sufficient water in Montana to irrigate ten million acres, four million more than the estimated amount of land that can at reasonable expense be irrigated. Stated in another way the annual flow of water out of the state is sufficient to cover the entire state with water to a depth of six inches.

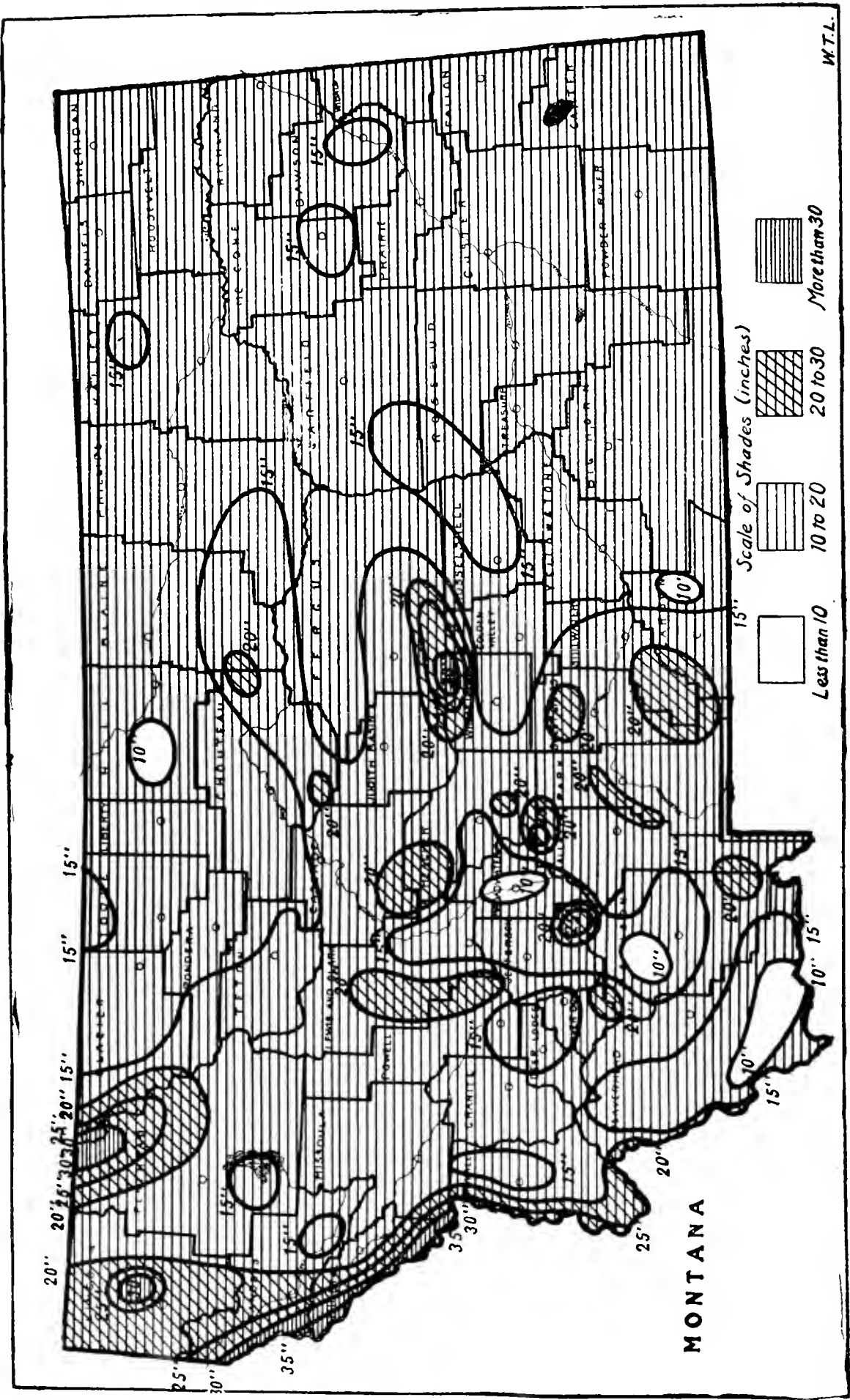
The waters of Montana do not go off in great floods. In almost every mountain range are glaciers and fields of perpetual ice and snow. The snow that falls in winter melts in different altitudes at different times and insures a steady flow of water at all seasons. From every mountain issue beautiful streams. Pure, clear and cold they come dashing down, making their way seaward, in some cases with tremendous falls. The fall of the streams cheapens the cost of irrigation and creates an abundance of water power for generating electricity. (See chapters in this volume on irrigation and hydro-electric power.)



Irrigated Oats, Flathead County.

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AVERAGE ANNUAL PRECIPITATION.



W.T.L.

(From Records of U. S. Weather Bureau.)

MONTANA CLIMATE



State Thermometers in Many Sections Have Not Descended Below Zero Since Christmas, 1924—Comparisons With Other States.



By W. T. Lathrop

In the three largest states in the Union, each so differently situated geographically and with such variety in the matters of topography and elevation, diversity of climate becomes evident upon even casual examination. Each of these states has its own climatic distinctions and wide variations. The first casual factor that engages the attention of the climatologist in viewing such distinctions is the presence of a seaboard in both Texas and California, the only states exceeding Montana in size, while Montana is an interior state with its lowest elevations nearly 2,000 feet above sea-level, with rugged and high ranges and ridges of the Rocky Mountains within it and along its western border, and with the Continental Divide traversing its western sections. Then, too, Montana lies farther north than any portion of Texas or California. This latter circumstance, while it is immediately linked up with thought of lower temperatures, is not generally so quickly recognized as lengthening the summer days and prolonging the daily tonic action of direct sunlight upon growing vegetation through the diminished atmospheric screen.

We find it necessary, or at least desirable, in Montana continually to refute statements made upon misinformation that the State, or some part of it, is the coldest place in the United States. It is not denied that occasionally very low temperatures do occur in Montana in winter, but they are neither as persistent nor often as low as many people in other parts of the country believe, and the charts of temperature distribution based upon official and unprejudiced observations collected by the Government show that the coldest areas in the United States, in winter and for the year, lie to the eastward of Montana. The highest temperatures on record for a number of Montana stations are higher than have ever been recorded in Alabama, Georgia, Florida, or in Cuba, but we make no claim from this fact that Montana is warmer than those sections. Yet such a claim would be justifiable if we yielded to the assertion that Montana is coldest of all the states simply because it has happened that an extreme of low temperature has been registered within its lines. The northern plains and mountain slopes show wide extremes of temperature in both directions, high and low. The range covered by all the temperatures ever recorded officially in Montana extends from -65° to 117° . Nor is this especially notable; it is typical of sections far in the interior of a large continent and in a moderately high latitude. The average range from our lowest to our highest temperature is very much less, though still ample and placing a strong accent upon the difference between summer and winter. Moreover, in both seasons the relative dryness of the atmosphere greatly mitigates the physical discomfort arising from the temperature conditions. The dry, warm days are more easily endurable than humid, warm days, and the dry cold of winter is far less trying than the humid cold of certain other parts of the country. This statement is superfluous to those who have lived both in Montana and in damp regions.

There is much variability of weather in Montana from year to year in the corresponding seasons. Once in a while a winter month is conspicuous for its

cold, and again for its warmth. In only one month since statewide service was instituted, in other words in a record going back to 1895, has the average of all temperature observations been under zero. That once was in the month of January, 1916, when a mean or average temperature of -0.7° was recorded for the State. On the other hand, the January mean has been as high as 29.2° (in 1919), which is higher than any January mean ever recorded in North Dakota, South Dakota, Minnesota, Iowa, Wisconsin, Michigan or, with three exceptions in a longer record, in the state of New York, and similarly with three exceptions, in New England. Of North Dakota's several months with lower average temperatures than have ever been recorded in Montana, one was January, 1916, when her mean temperature was -6.4° , while Montana's for the same month was, as above noted, -0.7° . Minnesota's coldest month was January, 1912, with a mean temperature of -6.7° . Wisconsin's coldest month, with a mean temperature of -2.5° , occurred at the same time.

January is normally our coldest month and July our warmest. The July average temperature in Montana has varied from 60.1° in 1915 to 70.2° in 1917. The average for the Julys from 1895 to 1925 is 66.2° , which, while pleasantly warm, is lower than the July normal mean temperature for North Dakota, South Dakota, Minnesota, Wisconsin, Michigan, Ohio, Pennsylvania, New York, or New England.

Cooler winters and warmer summers—or a greater difference between winter cold and summer heat—distinguish the eastern part of Montana, a plains country, from the mountainous western portion. The southern and western river valleys are, in the averages, the warmest areas in the State. Billings, in the Yellowstone Valley, with a mean annual temperature of 46.2° , is the warmest station with a long record. It is equalled in a very short record by Melstone, in the Musselshell



A Western Montana Stream.

Valley, and closely followed by Huntley and Hamilton, each with 46.0°, in the Yellowstone and Bitter Root Valleys, respectively. Elevated stations in the mountain sections show the lowest mean annual temperatures, as would be expected. It is desired to mention the fact that periods of beautiful exhilarating weather are characteristic of Montana's climate in winter as well as in summer and fall. This is written early in March, 1926, in a remarkable period of mild temperature which has long prevailed in Montana. At many places in the western part of the State thermometers have not descended below zero since Christmas week, 1924, and during the present winter the mercury has remained continuously above the zero line.

A general impression of the annual thermal distribution in Montana is more easily gained from the accompanying temperature chart, and of the monthly temperatures from the table of monthly mean or average temperatures, than from a long descriptive effort. The reader is referred to the table and to the chart, and it is suggested that he apply to the United States Weather Bureau, Helena, for any specific information along climatic lines not herein set forth.

Rainfall and snowfall also vary greatly from year to year and from month to month of the same year. Over nearly all the State the greatest amount of precipitation comes in the form of rain and in the months of May and June, when its beneficial effects upon crop growth and grass are at a maximum, corresponding to the need. Exceptions to this rule are practically confined to a small portion in the northwestern corner of the State, where the precipitation maximum occurs in the winter with a second maximum in the early part of the growing season. The average total annual precipitation for Montana for the last 31 years is 15.78 inches; the greatest annual total was 20.09 inches in 1908, and the least annual total, 11.04 inches in 1904.



Summer Snow: Elevation 8,000 Feet.

Because of the extent and topographical variety of Montana it seems futile to try to give an adequate description of the varying distribution of precipitation over the State. It seems better to present it in tabular form by months. The table is clear and can readily be interpreted by anyone interested who knows or will learn the location of the points tabulated. A chart herewith shows the average annual distribution, but it is impracticable to give it in chart form for each month.

AVERAGE TEMPERATURE FOR MONTANA

Stations—County	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ann'l
Adel, Cascade	21.6	22.2	29.2	40.7	46.7	54.3	61.3	60.2	52.2	42.5	34.6	25.6	40.9
Agric. College, Gallatin	21.2	22.4	30.2	40.4	48.8	57.0	63.6	62.5	52.6	43.4	31.4	23.3	41.4
Anaconda, Deer Lodge	23.5	25.5	31.9	40.8	47.8	55.5	63.2	61.9	52.8	44.7	33.7	25.3	42.2
Augusta, Lewis & Clark	21.2	22.5	29.1	42.0	49.0	56.2	62.3	60.7	52.0	44.3	31.9	25.5	41.4
Biddle, Powder River	18.5	22.3	31.2	41.1	52.9	63.4	70.0	67.3	58.5	45.9	32.7	23.0	43.9
Big Timber, Swt. Grass	25.6	27.7	33.8	45.0	53.4	62.7	68.6	67.4	57.2	41.1	29.5	28.8	45.1
Billings, Yellowstone	22.5	25.0	34.2	47.2	54.8	63.0	70.8	68.9	58.7	48.1	34.7	26.5	46.2
Bowen, Beaverhead	9.4	11.1	19.8	33.1	42.1	49.7	55.4	52.4	45.5	35.0	23.0	10.7	32.3
Brenner, Beaverhead	18.1	21.1	25.8	34.1	41.7	51.3	59.6	57.8	48.4	38.2	27.3	19.5	36.9
Browning, Glacier	16.3	18.7	27.6	39.7	46.9	56.2	61.7	60.0	51.4	41.5	29.7	20.9	39.2
Butte, Silver Bow	23.6	25.0	31.2	40.7	48.3	56.4	64.1	63.0	53.1	43.7	32.9	25.1	42.3
Cascade, Cascade	21.8	25.9	34.4	45.3	52.0	60.4	67.0	64.9	56.5	46.0	38.7	27.7	45.0
Chester, Liberty	9.7	12.8	25.9	41.8	51.9	59.3	66.5	64.0	53.4	44.9	30.4	18.3	39.9
Chinook, Blaine	14.1	15.9	26.0	44.1	54.4	63.5	70.0	67.1	56.0	45.3	30.1	20.2	42.2
Choteau, Teton	23.1	22.8	34.0	41.1	48.9	57.8	64.9	62.1	54.3	44.5	33.4	28.4	42.9
Circle (near) McCone	14.1	15.3	27.7	43.7	52.8	62.9	68.6	67.4	57.6	45.6	31.9	19.3	42.2
Crow Agency, Big Horn	18.6	20.2	32.6	46.4	56.7	65.0	71.2	69.1	58.7	47.1	33.3	24.5	45.3
Cut Bank, Glacier	16.9	17.7	27.0	41.2	48.7	56.9	63.0	61.5	51.3	41.9	28.6	23.3	39.8
Deer Lodge, Powell	21.6	24.0	30.1	40.6	51.3	61.1	67.7	64.1	55.4	44.0	33.1	21.0	42.8
Denton, Fergus	18.6	22.1	31.2	43.8	51.1	60.3	67.3	65.7	56.1	44.9	34.7	24.9	43.4
Dillon, Beaverhead	24.2	27.6	33.5	42.3	50.6	58.3	63.7	61.8	53.1	46.1	35.1	26.3	43.6
Ekalka, Carter	18.7	18.6	30.5	43.6	52.9	63.4	70.4	68.4	59.3	46.0	33.3	21.8	43.9
Findon, Meagher	22.0	23.0	28.6	37.8	45.1	54.4	61.1	60.7	50.8	41.3	32.8	23.7	40.1
Fort Benton, Chouteau	18.4	22.2	31.0	45.1	55.0	63.0	69.4	67.3	56.7	46.5	31.9	23.4	44.2
Fortine, Lincoln	17.8	23.3	33.3	42.4	49.4	57.5	62.7	60.4	51.7	42.2	31.4	22.5	41.2
Fort Shaw, Cascade	20.3	23.9	32.8	44.8	53.3	61.7	67.7	64.9	55.8	46.4	34.4	26.4	44.4
Glasgow, Valley	8.0	10.8	24.4	44.0	55.2	63.6	70.0	67.9	56.2	43.6	26.8	15.0	40.5
Glendive, Dawson	13.4	14.2	27.2	46.2	55.9	65.8	72.2	70.4	58.5	46.9	30.6	19.6	43.4
Goldbutte, Toole	12.8	16.6	27.3	40.9	49.2	59.0	64.6	62.7	53.4	41.5	30.6	19.1	39.8
Great Falls, Cascade	23.4	24.7	33.1	45.9	53.5	61.6	68.5	66.5	56.8	47.7	35.6	28.7	45.5
Hamilton, Ravalli	27.9	29.2	38.2	46.9	53.3	60.6	66.7	65.2	56.6	46.8	36.5	26.5	46.2
Harlowton, Wheatland	19.4	21.9	29.9	40.8	49.0	57.9	62.8	61.3	50.8	44.9	30.8	23.6	41.1
Haugan, Mineral	21.1	26.5	34.0	43.1	49.7	57.4	62.7	60.8	53.0	43.8	32.9	23.5	42.4
Havre, Hill	12.5	13.8	27.0	43.7	53.1	61.5	68.0	66.0	55.8	44.2	30.2	21.0	41.4
Hebgen Dam, Madison	12.4	14.8	25.6	33.7	43.3	51.4	57.4	56.6	47.8	37.0	25.2	12.7	34.8
Helena, Lewis & Clark	20.3	23.0	32.2	43.8	51.4	59.6	67.0	66.1	55.7	45.4	32.7	26.0	43.6
Heron, Sanders	24.9	28.9	35.5	45.2	52.0	58.6	64.4	63.4	54.1	44.0	34.6	26.0	44.3
Holter, Lewis & Clark	24.5	26.7	34.0	44.7	51.3	60.5	66.9	65.9	56.7	47.8	37.3	28.4	45.4
Jordan, Garfield	12.7	16.2	29.8	42.9	51.8	62.8	71.4	70.4	57.1	46.3	30.5	18.3	42.5
Kalispell, Flathead	22.0	24.2	33.1	43.8	51.3	58.1	64.5	62.8	53.2	43.6	32.7	24.9	42.8
Lewistown, Fergus	20.7	22.8	30.0	42.2	50.1	58.2	64.3	62.8	53.3	44.6	32.2	25.5	42.2
Libby, Lincoln	23.4	27.9	35.9	46.0	53.1	59.3	64.9	63.4	55.0	45.4	33.9	25.8	44.5
Livingston, Park	25.1	27.3	33.8	43.1	51.2	60.2	68.0	66.6	57.2	48.1	36.2	29.3	45.5
Malta, Phillips	8.6	12.6	26.2	44.2	54.0	63.8	69.8	67.9	56.8	44.4	29.6	15.3	41.1
Medicine Lake, Sheridan	5.6	7.7	19.9	41.6	52.1	63.4	66.3	65.3	54.0	41.4	25.0	13.8	38.0
Miles City, Custer	15.3	16.9	31.1	46.6	56.7	66.4	73.6	71.7	60.1	47.4	32.9	21.6	45.0
Missoula, Missoula	22.2	26.0	35.2	44.9	52.3	59.4	66.8	65.2	55.4	44.6	33.3	24.9	44.2
Ovando, Powell	17.3	19.0	29.1	39.4	47.6	54.9	61.2	59.5	50.9	41.0	29.5	19.9	39.1
Phillipsburg, Granite	22.2	24.5	31.6	41.1	47.1	55.4	62.2	60.7	52.5	43.0	32.1	24.4	41.4
Plevna, Fallon	14.2	15.8	26.2	43.0	52.2	62.8	70.2	66.7	56.4	43.8	32.8	18.9	41.9
Polson, Lake	24.1	27.9	35.1	43.6	51.6	60.1	67.6	66.1	55.5	46.1	34.6	26.9	44.9
Poplar, Roosevelt	6.1	8.6	23.8	43.8	54.9	62.7	70.6	67.9	57.2	44.7	27.7	14.7	40.2
Red Lodge, Carbon	20.6	20.9	27.9	38.8	45.9	55.7	61.4	60.2	51.2	41.0	31.5	23.2	39.9
Renova, Jefferson	24.4	26.4	34.3	43.9	51.0	59.1	65.3	63.7	54.8	45.8	35.6	26.0	44.2
Roundup, Musselshell	24.5	24.0	31.8	44.3	51.6	64.1	72.1	66.9	59.7	46.4	35.1	19.3	45.0
Saint Ignatius, Missoula	24.1	27.1	35.9	45.8	52.0	59.4	65.7	64.5	54.8	45.0	34.4	26.2	44.6
Shelby, Toole	15.1	14.9	26.9	42.1	50.5	60.4	66.6	65.2	53.8	42.7	30.2	18.8	40.6
Sidney, Richland	10.2	12.8	25.4	43.8	55.0	63.2	68.7	67.0	55.9	44.5	28.8	17.6	41.1
Snowbelt (near Garfield)	16.6	19.5	29.1	41.9	51.6	62.1	69.6	67.6	55.7	44.1	31.4	18.8	42.3
Stevensville, Ravalli	24.3	28.2	35.7	44.1	50.0	58.3	65.2	64.1	53.6	43.4	33.0	24.7	43.7
Superior, Mineral	24.3	28.2	36.4	41.8	49.8	57.8	66.0	65.0	55.0	43.3	32.0	24.7	43.7
Thompson Falls, Sanders	24.9	28.9	35.9	45.1	51.6	59.8	66.3	64.6	55.3	45.5	34.3	26.1	44.9
Three Forks, Gallatin	21.7	24.2	32.9	43.5	51.7	59.8	65.5	63.6	53.7	42.6	30.2	21.0	42.5
Up. Yaak River, Lincoln	19.2	25.1	32.0	41.5	48.7	56.5	61.7	61.1	50.8	41.7	29.9	18.8	40.6
Utica, Judith Basin	23.0	24.1	29.9	42.1	49.4	58.0	64.8	64.6	54.6	45.0	34.3	26.8	43.0
Valentine, Fergus	14.8	17.8	29.8	42.9	51.2	62.0	69.2	67.0	56.5	45.6	31.9	20.1	42.4
Valier, Pondera	17.5	20.4	28.1	42.5	49.8	58.7	64.8	63.9	53.6	43.1	33.1	21.9	41.4
Virginia City, Madison	20.7	23.5	29.4	39.5	47.4	56.5	65.1	63.7	53.1	42.8	30.5	22.8	41.2
Wht. Sul. Spgs., Meagher	21.2	22.6	27.9	40.2	47.8	56.8	62.5	61.2	50.4	41.2	31.6	21.7	40.4
White Water, Phillips	8.1	12.3	22.6	40.1	51.3	60.8	67.2	65.3	52.5	40.4	26.4	12.3	38.3

The snowfall is lightest over the plains and heaviest over the mountain regions of the western and southwestern portions, where it provides a reserve of moisture which, except following winters of less than normal snowfall, keeps the streams up in the growing season and supplies water for irrigating purposes to supplement the moisture falling as rain and the small amounts deposited as dew in the cool mornings.

Another climatic element exhibiting much difference over the State is the length of the season between the last killing frost of spring and the first killing

AVERAGE PRECIPITATION FOR MONTANA

Stations—County	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ann'l
Adel, Cascade	1.32	1.31	1.55	1.98	3.52	3.76	1.95	1.58	2.23	1.92	0.95	1.33	23.40
Agric. College, Gallatin	0.85	0.81	1.26	1.72	3.49	3.00	1.27	1.02	1.72	1.35	0.94	1.02	18.45
Anaconda, Deer Lodge	0.90	0.70	0.87	0.92	2.22	2.22	1.33	0.95	1.28	0.91	0.80	0.75	13.85
Augusta, Lewis & Clark	0.69	0.45	0.89	1.09	2.86	3.06	1.76	1.09	1.59	0.77	0.52	0.53	15.30
Biddle, Powder River	0.47	0.34	0.50	1.27	2.58	2.76	1.97	1.57	1.55	0.90	0.39	0.33	14.63
Big Timber, Swt. Grass	0.68	0.57	1.03	1.25	3.04	2.24	1.50	1.02	1.75	1.35	0.82	0.43	15.68
Billings, Yellowstone	0.68	0.40	0.80	1.16	2.79	2.37	1.20	0.98	1.13	1.21	0.80	0.44	13.96
Bowen, Beaverhead	0.90	0.77	0.78	0.73	1.41	1.93	1.04	0.78	1.11	0.86	0.88	0.95	12.14
Brenner, Beaverhead	0.68	0.52	0.69	1.24	1.42	1.40	1.12	0.71	1.27	0.94	0.71	0.77	11.47
Browning, Glacier	0.75	0.60	0.61	0.85	1.69	2.11	1.11	1.13	1.90	0.52	0.47	0.45	12.19
Butte, Silver Bow	0.84	0.78	1.09	1.13	2.09	2.23	1.26	0.85	1.18	0.97	0.81	0.82	14.05
Cascade, Cascade	0.71	0.68	0.69	1.45	3.23	3.55	1.48	1.21	1.76	1.42	0.59	0.62	17.39
Chester, Liberty	0.60	0.26	0.34	0.47	1.60	2.77	1.02	1.18	1.30	0.30	0.32	0.34	10.50
Chinook, Blaine	0.63	0.37	0.43	0.76	2.09	2.56	1.41	1.16	1.36	0.70	0.51	0.46	12.44
Choteau, Teton	0.77	0.55	0.47	0.76	2.00	3.20	1.85	0.96	0.94	0.47	0.42	0.55	12.94
Circle(near McCone	0.98	0.93	1.50	1.20	2.36	4.49	1.83	1.66	1.27	1.07	0.75	1.02	19.06
Crow Agency Big Horn	0.78	0.62	0.92	1.33	2.50	2.65	1.26	0.89	1.03	1.23	0.79	0.70	14.70
Cut Bank, Glacier	0.50	0.53	0.69	0.71	2.29	2.56	1.71	1.16	1.54	0.73	0.75	0.45	13.62
Deer Lodge, Powell	0.70	0.48	0.92	0.82	1.65	2.22	0.90	0.81	1.26	0.74	0.67	0.62	11.79
Denton, Fergus	0.71	0.30	0.49	0.91	1.87	3.12	1.87	0.98	1.83	0.88	0.42	0.44	13.82
Dillon, Beaverhead	0.92	0.74	1.31	1.89	3.25	2.66	1.44	1.17	1.61	1.00	0.95	0.78	17.72
Ekalaka, Carter	0.39	0.35	0.66	0.91	2.26	2.48	1.70	1.58	1.36	0.73	0.28	0.30	13.00
Findon, Meagher	0.80	0.64	0.75	1.39	2.87	3.18	2.46	1.44	1.98	0.91	0.82	0.64	17.88
Fort Benton, Chouteau	0.74	0.45	0.57	1.15	2.67	2.44	1.59	1.00	1.10	0.64	0.54	0.55	13.44
Fortine, Lincoln	1.66	1.23	1.37	1.02	1.81	2.43	1.52	1.51	1.56	1.10	1.62	1.27	18.10
Fort Shaw, Cascade	0.52	0.44	0.41	0.65	1.92	2.24	1.31	0.95	0.97	0.67	0.35	0.47	10.90
Glasgow, Valley	0.61	0.48	0.98	0.96	2.29	2.57	1.40	1.11	1.05	0.67	0.50	0.55	13.17
Glendive, Dawson	0.64	0.52	0.98	1.12	2.30	3.18	1.78	1.41	1.33	0.88	0.51	0.60	15.25
Goldbutte, Toole	0.62	0.41	0.39	0.58	1.84	3.06	1.66	1.29	1.36	0.59	0.36	0.36	12.52
Great Falls, Cascade	0.68	0.56	0.83	1.21	2.48	3.29	1.69	1.07	1.40	0.89	0.74	0.62	15.46
Hamilton, Ravalli	0.87	0.67	0.72	0.97	1.68	1.66	0.68	0.64	1.11	0.93	0.87	0.49	11.29
Harlowton, Wheatland	0.78	0.68	0.80	0.95	2.22	2.31	1.51	0.71	1.28	0.77	0.81	0.61	13.43
Haugan, Mineral	4.26	2.44	3.01	1.58	1.78	1.68	0.76	0.87	1.80	2.26	3.47	3.96	27.87
Havre, Hill	0.78	0.51	0.53	0.90	1.90	2.74	1.81	1.20	1.27	0.69	0.63	0.58	13.54
Hehgen Dam, Madison	2.38	1.44	1.71	1.30	2.48	2.01	1.77	1.08	1.74	1.58	1.14	1.56	20.19
Helena, Lewis & Clark	0.94	0.67	0.77	1.06	2.15	2.32	1.14	0.70	1.25	0.90	0.12	0.77	13.39
Heron, Sanders	3.72	2.93	3.50	2.30	2.10	2.02	1.50	1.22	2.14	2.30	3.95	4.22	31.90
Holter, Lewis & Clark	0.69	0.78	0.57	1.14	2.42	2.80	1.46	0.99	1.51	1.17	0.54	0.59	14.66
Jordan, Garfield	0.74	0.61	0.60	0.76	2.07	2.77	1.64	1.05	0.83	0.67	0.22	0.67	12.63
Kalispell, Flathead	1.34	1.05	1.06	0.82	1.71	1.98	1.15	1.01	1.47	0.94	1.54	1.14	15.21
Lewistown, Fergus	0.80	0.82	1.08	1.39	3.05	3.54	2.42	1.35	1.61	1.26	0.79	0.78	18.89
Libby, Lincoln	2.61	1.70	1.68	1.09	1.53	1.64	1.17	0.94	1.56	1.61	3.40	2.34	21.27
Livingston, Park	0.60	0.55	0.87	1.20	3.19	1.77	1.16	0.88	1.60	1.03	0.89	0.49	14.23
Malta, Phillips	0.58	0.43	0.43	0.69	2.22	3.57	1.85	1.23	1.24	0.55	0.40	0.39	13.58
Medicine Lake, Sheridan	0.47	0.44	0.49	1.16	1.72	2.92	2.11	1.53	1.54	0.88	0.29	0.30	13.85
Miles City, Custer	0.65	0.51	0.90	1.02	2.16	2.83	1.58	1.06	0.94	0.85	0.55	0.50	13.55
Missoula, Missoula	1.35	0.86	1.02	1.03	2.12	2.15	1.02	0.86	1.34	1.20	1.18	1.43	15.56
Ovando, Powell	1.82	1.56	1.23	1.08	2.28	2.44	1.18	1.08	1.37	1.26	1.70	1.89	18.89
Philipsburg, Granite	0.71	0.69	0.97	1.27	2.38	2.84	1.40	0.93	1.56	1.17	0.96	0.58	15.46
Plevna, Fallon	0.59	0.45	0.65	1.12	2.11	2.79	1.90	1.32	1.05	0.85	0.46	0.38	13.67
Polson, Lake	1.14	0.89	1.07	1.23	1.49	2.37	1.19	0.89	1.52	1.16	1.42	1.29	15.66
Poplar, Roosevelt	0.59	0.45	0.81	0.90	1.84	3.02	1.73	1.14	0.94	0.70	0.65	0.43	13.20
Red Lodge, Carbon	0.77	0.78	1.49	2.50	4.13	2.23	1.28	0.94	1.88	1.60	0.62	0.69	18.91
Renova, Jefferson	0.43	0.34	0.52	1.27	2.19	2.25	1.18	0.86	1.35	0.94	0.45	0.31	12.09
Roundup, Musselshell	0.94	0.44	0.69	0.95	2.36	3.62	1.82	0.88	1.17	0.96	0.68	0.89	15.40
St. Ignatius, Missoula	0.95	0.80	0.87	1.34	2.35	2.39	1.21	0.94	1.92	1.36	1.24	0.76	16.13
Shelby, Toole	0.38	0.36	0.30	0.71	1.76	2.07	1.28	1.43	1.57	0.79	0.21	0.37	11.23
Sidney, Richland	0.51	0.42	0.58	0.91	2.10	3.28	1.97	1.63	1.77	0.83	0.39	0.50	14.89
Snowbelt (near) Garfield	0.61	0.53	0.91	0.89	2.26	2.79	2.44	1.21	1.37	0.91	0.60	0.81	15.33
Stevensville, Ravalli	0.79	0.58	0.51	0.81	1.75	1.72	0.79	1.12	1.48	1.26	0.98	0.64	12.43
Superior, Mineral	1.38	1.15	1.87	1.16	2.34	1.62	1.03	0.90	1.60	0.92	1.32	2.21	17.50
Thompson Falls, Sanders	2.24	1.47	1.95	1.57	1.79	1.60	1.42	0.80	1.41	1.60	2.22	2.36	20.43
Three Forks, Gallatin	0.25	0.35	0.39	0.94	1.70	1.91	0.99	0.69	1.24	0.86	0.53	0.48	10.33
Up. Yaak River, Lincoln	2.06	1.57	1.86	1.75	1.53	1.63	0.94	1.19	1.98	1.52	2.02	2.33	20.38
Utica, Judith Basin	0.65	0.38	0.80	1.17	2.83	3.39	2.10	1.19	1.38	1.15	0.81	0.58	16.43
Valentine, Fergus	0.46	0.32	0.37	0.68	2.21	2.37	1.55	1.20	0.94	0.73	0.32	0.29	11.44
Valier, Pondera	0.35	0.22	0.25	0.67	1.61	2.18	1.65	1.43	1.63	0.78	0.21	0.38	11.36
Virginia City, Madison	0.62	0.54	1.03	1.21	2.70	2.16	1.25	1.09	1.39	0.89	0.89	0.77	14.54
Wht. Sul. Spgs., Meagher	0.34	0.32	0.38	0.82	1.43	1.99	1.59	0.81	1.30	0.70	0.39	0.46	10.53
White Water, Phillips	0.37	0.39	0.44	0.75	1.54	2.68	2.21	1.48	1.16	0.36	0.24	0.34	11.96

frost of autumn. It depends upon how far the points examined are separated north and south of each other (for a north and south line can be drawn for 275 miles across Montana), and upon whether they lie on the plains, in the valleys, on the benches, or in the mountains. The longest killing frost free seasons are, in general, those of the plains sections.

FROST DATA FOR MONTANA

Stations—Counties	Length of Record Years	Average Date last killing frost in Spring	Average Date first killing frost in Autumn
Adel, Cascade	23	June 12	Sept. 1
Agric. Col., Gallatin	28	May 22	Sept. 12
Anaconda, Deer Lodge	21	June 10	Sept. 11
Augusta, Lewis & Clark	22	June 4	Sept. 4
Biddle, Powder River	14	May 23	Sept. 18
Big Timber, Sweet Grass	15	May 23	Sept. 14
Billings, Yellowstone	26	May 16	Sept. 26
Bowen, Beaverhead	15	**	**
Brenner, Beaverhead	8	June 14	Sept. 12
Browning, Glacier	12	June 16	Sept. 2
Butte, Silver Bow	28	May 29	Sept. 18
Cascade, Cascade	17	May 19	Sept. 17
Chester, Liberty	17	May 25	Sept. 7
Chinook, Blaine	25	May 14	Sept. 18
Choteau, Teton	14	May 25	Sept. 14
Circle (near McCone)	20	May 28	Sept. 16
Crow Agency, Big Horn	40	May 14	Sept. 26
Cut Bank, Glacier	13	May 21	Sept. 13
Deer Lodge, Powell	16	June 11	Sept. 6
Denton, Fergus	13	May 17	Sept. 23
Dillon, Beaverhead	23	June 1	Sept. 5
Ekalaka, Carter	20	May 25	Sept. 22
Findon, Meagher	9	May 28	Sept. 18
Fort Benton, Chouteau	28	May 11	Sept. 23
Fortine, Lincoln	15	June 13	Aug. 26
Fort Shaw, Cascade	21	May 19	Sept. 18
Glasgow, Valley	26	May 21	Sept. 17
Glendive, Dawson	32	May 14	Sept. 22
Goldbutte, Toole	14	May 29	Sept. 14
Great Falls, Cascade	29	May 8	Sept. 24
Hamilton, Ravalli	22	May 17	Sept. 23
Harlowton, Wheatland	17	June 7	Sept. 4
Haugan, Mineral	14	June 14	Aug. 28
Havre, Hill	40	May 16	Sept. 19
Hebgen Dam, Madison	18	July 3	Aug. 15
Helena, Lewis & Clark	42	May 9	Sept. 28
Heron, Sanders	10	May 29	Sept. 3
Holter, Lewis & Clark	19	May 19	Sept. 17
Jordan, Garfield	14	May 19	Sept. 19
Kalispell, Flathead	23	May 5	Oct. 2
Lewistown, Fergus	22	May 29	Sept. 7
Libby, Lincoln	27	June 6	Sept. 6
Livingston, Park	20	May 18	Sept. 19
Malta, Phillips	15	May 21	Sept. 25
Medicine Lake, Sheridan	11	May 23	Sept. 15
Miles City, Custer	29	May 5	Oct. 2
Missoula, Missoula	31	May 23	Sept. 18
Ovando, Powell	22	June 19	Aug. 16
Philipsburg, Granite	17	June 14	Aug. 29
Plevna, Fallon	9	May 23	Sept. 26
Polson, Lake	15	May 13	Sept. 28
Poplar, Roosevelt	36	May 15	Sept. 16
Red Lodge, Carbon	22	June 8	Sept. 4
Renova, Jefferson	24	May 26	Sept. 9
Roundup, Musselshell	7	May 17	Sept. 30
Saint Ignatius, Missoula	17	May 22	Sept. 20
Shelby, Toole	10	May 27	Sept. 14
Sidney, Richland	16	May 20	Sept. 22
Snowbelt (near) Garfield	7	May 16	Oct. 2
Stevensville, Ravalli	11	May 22	Sept. 21
Superior, Mineral	7	June 7	Sept. 7
Thompson Falls, Sanders	11	May 20	Sept. 22
Three Forks, Gallatin	19	June 1	Sept. 9
Upper Yaak River, Lincoln	8	June 13	Aug. 29
Utica, Judith Basin	28	May 26	Sept. 18
Valentine, Fergus	15	May 21	Sept. 16
Valier, Pondera	10	May 21	Sept. 28
Virginia City, Madison	18	June 2	Sept. 19
White Sulphur Springs, Meagher	14	June 2	Sept. 4
White Water, Phillips	7	May 30	Sept. 15

**Freezing temperature often occurs every month.

The People of Montana



Soldiers' Memorial, Fort Benton.

The beginnings of Montana were made by the sturdiest race which has yet been known—the American pioneer.

It was the lure of gold that brought these pioneers in the late '50s and early '60s across the plains and over the mountains to Montana. Those in search of the yellow metal populated Alder gulch and Bannock and other camps. Yet it was not gold and silver alone that lay behind the early day development. There were other things of equal importance. There was national unrest following the Civil war. There was the thrill of a new country, and new money to be made from it. It was not altogether a matter of riches. Those were the days of "the poor man's chance," when land was free. Any man with strength and courage could be his own master. As a result those

who first came to Montana were the men and women willing to face unknown dangers. The weak and timid were left behind. The strong and fit went forth to blaze the trail.

These men and women builded in Montana a picturesque civilization. It has passed. The new has taken its place. Montana is no longer of the "wild and woolly" west. The cowboy has gone. The bloodthirsty Indian is found only at county fairs and then on the payroll of the local Chamber of Commerce.

Montana is today a land of splendid schools and churches, of strong financial and benevolent institutions, peopled by a progressive citizenship. The new citizen will, in coming to Montana, find that he need not leave the corner drug store, the moving picture theatre or even the push button. Illustrations of modern farm life are to be found on every hand, even in the newest communities. The well furnished home, the opportunities for social intercourse are everywhere.

In a work of this kind it is impossible to mention all of the institutions of a great state like Montana. In the next few pages a few of the characteristics of her people and a few of her institutions will be outlined.

MONTANA CHARACTERISTICS



A Land of Home Owners--Less Than Four Inhabitants to the Square Mile in 1925.



According to the best available estimates the population of Montana in October, 1925, was 55,617.* Fifty-five years ago the population was 20,595. The following table indicates Montana's growth:

Census Year	Population	Increase Over Preceding Period		Per cent of increase in the U. S.
		Number	Per Cent	
1925 (Division Vital Statistics)*.....	555,617	179,564	47.7	16.0
1910	376,053	132,724	54.5	21.0
1900	243,329	100,405	70.3	20.7
1890	142,924	103,765	265.0	25.5
1880	39,159	18,564	90.1	30.1
1870	20,595	.....	.....	.....

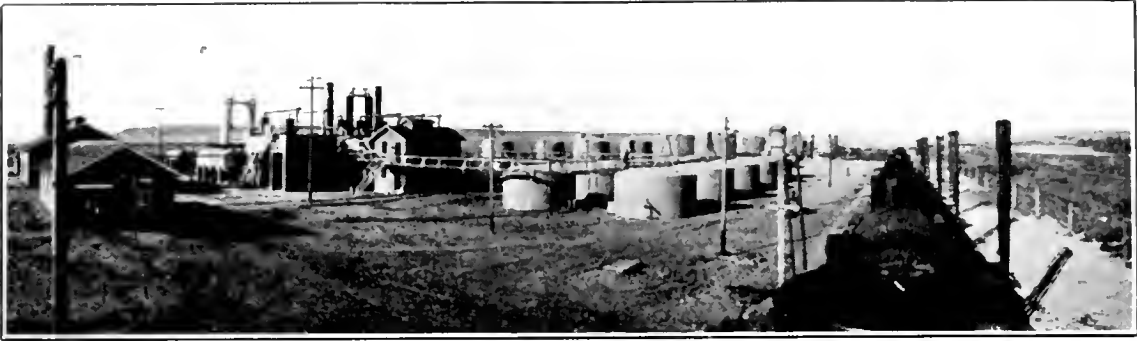
*In March, 1926, the Federal Bureau of Census estimated the population of Montana to be 672,466, a gain of 22,489 in 1926 over 1925. This estimate is believed too high and in this volume, the estimate of the Montana Division of Vital Statistics is used. Population of Montana, July 1, 1926, is estimated by the Bureau at 694,965.

The United States census estimates that 97.3 per cent of the population is white. Indians number two per cent, the remainder being divided between negroes and orientals.

The total land area of the state is 146,131 miles. The average number of inhabitants to the square mile at the end of 1925 is estimated to be 3.9, as against



Beet Field on Teton River.



A Montana Refinery.

2.6 in 1910 and 1.7 in 1900. Montana thus contains about one-twentieth of the land area of the United States and about .5 per cent of the population. Were Montana as densely settled as the average of the sister states we would today have a population of about 5,500,000. In common with many of the western states there are more males than females in Montana, the last government figures giving for males 299,941 and females 248,948.

A Land of Home Owners.

Montana is a land of home owners. The latest available figures show a total of 139,912 homes in the State. Of these, 81,840 are owned by the occupants and 53,362 are rented. In percentage of home ownership Montana ranks with the first three states.

Illiteracy Low.

The percentage of illiteracy in Montana is estimated at 2.3. There is a dispute as to the exact rating of the state in relation to the other commonwealths, but it is safe to say that in the percentage of illiterates Montana ranks with the two or three most foremost states. Illiteracy of native whites is only .3 of one per cent.

Montana a "Doubtful" State.

Politically Montana stands with those states classified as "doubtful" at election time. The state is thus protected against the abuses of unbridled political power. In the first national election following statehood, Montana's electoral vote was cast for Benjamin Harrison; in 1896 and 1900 for William J. Bryan; in 1904 for Theodore Roosevelt; in 1908 for William H. Taft; in 1912 and 1916 for Woodrow Wilson; in 1920 for Warren G. Harding, and in 1924 for Calvin Coolidge. The present governor of Montana is a Democrat, a majority of the other state officials are Republicans.

PAST PRESIDENTIAL VOTE OF MONTANA

1892 (Pres.), Cleveland, Dem., 17,581; Harrison, Rep., 18,851; Weaver, People's, 7,334; Bidwell, Proh., 549.	1912 (Pres.), Wilson, Dem., 27,941; Taft, Rep., 18,512; Roosevelt, Prog., 22,456; Debs, Soc., 10,885.
1896 (Pres.), Bryan, Dem. and People's (Populist), 42,537; McKinley, Rep., 10,494; Levering, Proh., 186.	1916 (Pres.), Wilson, Dem., 101,063; Hughes, Rep., 66,750; Roosevelt, Prog., 298; Benson, Soc., 9,564.
1900 (Pres.), Bryan, Dem., 37,145; McKinley, Rep., 25,373; Woolley, Proh., 298; Debs, Soc., 708.	1916 (U. S. Sen.), Dem., 85,380; Rep., 72,758; Soc., 9,292.
1904 (Pres.), Parker, Dem., 21,773; Roosevelt, Rep., 34,932; Swallow, Proh., 335; Debs, Soc., 5,676.	1920 (Pres.), Cox, Dem., 57,372; Harding, Rep., 109,430; Christensen, F.-Lab., 12,204.
1908 (Pres.), Bryan, Dem., 29,326; Taft, Rep., 32,333; Chafin, Proh., 827; Debs, Soc., 5,855.	1924 (Pres.), Coolidge, Rep., 74,138; Davis, Dem., 33,805; LaFollette, Ind., 61,105.

Agricultural Legislation.

Much of the energy of the state is being spent in the development of the agricultural interests. Intelligent legislation has been passed for the benefit of the farmer. This legislation is administered by the Commissioner of the Department of Agriculture, Labor and Industry. Legislation provides for the proper grading of grain, the strict inspection of grain elevators and the furnishing of trained state agents to assist the farmer in solving his individual problems.

Another stimulus to better farming is given by numerous state and county fairs held each year. (See page on Montana State Fair.)

People Patriotic.

The people of Montana are patriotic. During the World War 35,000 entered the army or navy. In the Liberty Loan and other campaigns Montana made an admirable record.

Progressive.

The people of Montana are progressive. For example, according to the United States Census Bureau in 1922 there were a total of 55,115 telephones in the state; one for every ten inhabitants.

Prosperous.

The people of Montana are prosperous. For example, according to the United States Census, wealth per capita in Montana in 1912 was estimated to be \$2,792. Eleven years later our per capita wealth was estimated at \$3,619. As another extreme in estimating prosperity: The United States Census Bureau estimated there were 415 paupers in the almshouses of Montana in 1910. In 1923 the number of paupers in almshouses had been reduced to 324, though the population of the State increased during the same period almost 50 per cent.

The Size of Montana.

Montana is a land of variety. Few things are omitted. The soil, the water, the air, the forests, the people and their institutions, furnish a variety that lends spice to life and enjoyment in Montana. There are 170.4 acres in Montana for each inhabitant. The District of Columbia has but one-tenth acre, Rhode Island but one acre, and Washington, to the west, but 31 acres to each inhabitant.



Rapids on Flathead River Below Polson.

THE UNIVERSITY OF MONTANA



One Hundred Buildings Used by Various Units—4,444 Students Registered at All Branches of University.



The constitution of the State of Montana specifies that the general control and supervision of the University of Montana shall be exercised by the State Board of Education. The University of Montana comprises twenty-five teaching and research units. There are twelve schools and colleges in the State University at Missoula, four colleges and three schools at the State College at Bozeman, the School of Mines and a Bureau of Mines at the State School of Mines, Butte, and a Normal College with three regional summer schools and a Teachers' Service Division directed by the State Normal College at Dillen. In addition to these teaching and research units the State College at Bozeman directs the work of the Agricultural Experiment Station and the Agricultural Extension Division.

The State Board of Education is charged with the appointment of the administrative, educational and clerical officers of the various units of the University of Montana. This staff is composed of 433 persons. The Chancellor is the chief executive officer of the University of Montana.

The various units of the University operating under the control of the State Board of Education own 3,764 acres of land. One hundred buildings are used by the various units of the Greater University. The value of the land, buildings and equipment is \$7,000,000.

During the last year 4,444 students were registered in the four teaching units of the University of Montana. Over 120,000 people in the state were served by the various Extension and Experiment Station organizations during the year 1924-1925.



Western Montana Orchard.

PUBLIC SCHOOLS



Montana Employs Over 5,700 Teachers—Qualifications of Teachers Outlined.



By Mina Petrashek.

School districts have been organized and schools are maintained wherever land is surveyed and settled. Except in extremely sparsely settled sections there is a school within reasonable distance of every child. According to the latest biennial survey, there were in Montana 2,481 one-room schools, 110 two-room schools, 164 village schools, and 155 schools in towns and cities; 209 cities, towns, and larger villages are provided with either district or county high schools. Attendance at these high schools is free to any child residing within the county in which the high school is located.

Montana derives her school revenues from several sources. The income derived from investments of the permanent school fund and from leases of school lands constitutes an annual revenue to school districts of from \$5 to \$7.50 per census child. The schools also receive some of the revenue derived from the metal mines tax, the inheritance tax, the oil license tax, and federal oil and gas royalties.

In each county a uniform levy of six mills on all taxable property furnishes



Central Montana Stream.

a fund which is distributed to all districts on the census basis. The amount derived from this source is much greater than that derived from state sources, in some counties amounting to \$40 per census child. There is also a uniform county levy for high schools distributed to high schools of the county on the basis of attendance and number of teachers employed.

By far the greatest portion of funds necessary to maintain a school is derived from a special levy on the property of the school district. Funds for building purposes are raised entirely by the district.

The majority of schools in Montana maintain terms of from seven to nine months in length. No district may have its high school accredited unless its term is at least 170 days of actual teaching.

In architectural design school buildings in Montana compare favorably with those of any other state. The State Board of Health and Superintendent of Public Instruction must grant approval of building plans before a building may be constructed. Many rural districts have built and equipped cottages for the use of teachers; some village schools and several county high schools have dormitories where children from a distance are taken care of during the week; practically all high schools have gymnasiums which provide an opportunity for physical development.

It is generally conceded that as is the teacher so is the school. Montana's certification requirements insure considerable preparation for the work of teaching. No one can secure a certificate to teach in Montana without twelve weeks of normal training in addition to a four-year high school course. After September 1st, 1926, the minimum will include 24 weeks of normal training, and after September 1st, 1927, all teachers must have had a year of advanced normal work. These requirements, with the passing of examinations, qualify teachers for rural and small village positions. Teachers in larger places are generally required to be



Natural Bridge in Southeastern Montana.

graduates of standard normal colleges if they teach in elementary schools, or of accredited universities if in high schools. Montana employs over 5,700 teachers and the average length of service is four years.

Twenty high schools maintain normal training departments whose graduates receive two-year teachers' certificates valid in rural schools.

The State Normal College, located in Dillon, maintains annually three regional summer schools for teachers, at Lewistown, Miles City, and Billings. Credits earned in these schools are recognized as college work and can be applied toward teachers' certificates in lieu of examinations.

Every elementary or rural teacher in the State is supplied with a course of study published by the Department of Public Instruction. The excellence of this course has been favorably commented upon by leading educators in many other states. In addition to guidance furnished by this course, teachers have opportunities to assemble for observation and discussion of best teaching practices under the direction of County Superintendents and State School Supervisors. Larger schools, as in most states, employ Supervising Principals.

A rural school which meets certain high standards of excellence as to qualifications of the teachers, type of school building, and completeness of equipment is rated as a "Standard School." One meeting a still higher standard or nearing perfection is rated as a "Superior School." Schools receiving either rating are awarded appropriate distinguishing plates. Schools bearing standard or superior school plates are found in every county of the State.

High schools in Montana are all accredited on the basis of standards adopted by the State Board of Education. Many of the larger high schools are members of the Northwest and North Central Accrediting Associations, and their graduates are admitted to all colleges and universities which do not require entrance examinations of all applicants for admission.



CHURCHES AND FRATERNAL ORGANIZATIONS



All Cults and Philosophies Represented in Montana—Membership of Churches Estimated at 165,000.



Religions, denominations, fraternal organizations, cults and philosophies are well represented in Montana. The new settler need not fear in coming to this State that he will lack opportunity to mingle with fraternal brothers of his own particular desire. There may be some organizations and adherents of faith and worship which are not represented, but we have worshipping unmolested under their own vine and fig tree Christian, Jew and Pagan. If the Buddhist, Mohammedan, or Confucian finds his way here, he can make his shrine and pray as he likes. We have Adventists, Baptists, Catholics, Christians, Christian Scientists, Congregationalists, Episcopalians, Greeks, Jews, Methodists, Mormons, Presbyterians, Quakers, Spiritualists, Unitarians, etc. In every city of Montana will be found splendid church buildings.

Almost every fraternal organization is represented. Space forbids detailed statements, but as an example there are 143 Masonic Lodges having a membership of 19,887; the Elks in 1925 had a total membership of 7,560. There are 112 Odd Fellows' Lodges having 8,631 members. There were 173 Boy Scout troops with a total membership of 3,379 in 1925.



Churches.

The growth of the churches and church membership in Montana has kept pace with the growth of the State. Following is the membership of churches in 1916:

Members.

(Compiled by Bureau of Census, 1916.)

All Denominations	Roman Catholic	Methodist	Baptist	Presbyterian
137,566	78,113	13,873	4,073	6,724
Protestant Episcopal	Unitarian	Lutheran	Reformer.	Congregational
4,607	375	9,129	136	3,841

Ten years later the membership has been estimated as follows:

All Denominations	Roman Catholic	Methodist	Lutherans	Baptist
165,000	96,021	14,572	15,000	4,320
Protestant Episcopal	Seventh-Day Adventists		Evangelical Lutheran	
8,496	875		3,000 communicants	

The Roman Catholic Church.

The pioneer Catholic missionary in Montana was Father Peter DeSmet, S. J., who came to western Montana in response to a request for the "Black Robe" from a delegation of Flathead Indians, on June 30, 1840.

March 7, 1884, the Right Reverend John B. Brondel was appointed the first Bishop of Montana by the late Pope Leo XIII. Helena was the See city. At that time there were 16 priests and 16 churches, and the Catholic population was estimated to be about 15,000.

On May 18, 1904, after the death of Bishop Brondel, the State was divided into two dioceses, with Great Falls the Episcopal See of the new diocese. In 1905 the Right Reverend John P. Carroll took charge of the diocese at Helena. In the next twenty years a magnificent Cathedral was built, a Parochial school established, and the Mount Saint Charles College buildings erected. There are today 139 churches in the State and 154 priests. The value of church property owned in the State is not available. The average salary paid to priests is given at from \$400 to \$1,000.

The growth of the Catholic church is indicated by the statistics recorded below:

	1904	1920	1926
Number of priests.....	32	147	164
Number of churches	74	226	229
Catholic population	31,000	93,000	96,021

The Methodist Episcopal Church.

The first sermon by a minister of this faith delivered in Montana is said to have been given by the Reverend Mr. Craig at Bannock, then the capital of Montana, on January 10, 1864. The following summer a small church was built at Junction City. In the fall of the same year the General Missionary Society sent Reverend A. M. Hough to superintend the Montana Methodist missions.

In 1873 the first statistics were reported. The membership on that date was given at 133. There were four churches, reported to be worth \$14,200.

From these beginnings the church in Montana has grown until the 1925 statistics show:

Number of ministers.....	101
Number of churches.....	173
Number of members in State.....	14,572
Value of church property.....	\$1,498,600
Average salary paid to ministers.....	\$1,584

The Baptists in Montana.

The Montana Baptist convention was organized 17 years ago. Since the organization of the convention the denomination has made rapid progress. It has

besides regular pastors of churches, a superintendent of missions, a corresponding secretary, three district missionaries, three colporters and a state evangelist. A summer assembly for young people is conducted near Livingston.

Statistics for 1926 are given below:

Number of ministers.....	35
Number of churches.....	51
Number of adult members.....	4,320
Value of church property.....	\$498,410
Average salary paid to ministers.....	\$1,800

Episcopal Church in Montana.

In July, 1867, Daniel Sylvester Tuttle arrived in Virginia City, the first minister of the Episcopal church to enter this new territory. He was sent as "Missionary Bishop of Montana, with jurisdiction in Idaho and Utah." He began his work at once, and organized St. Paul's Church in that then busy and prosperous town. During those first years he had often only one or two clergy in Montana to help him; and, being responsible also for Idaho and Utah, he literally had "congregations a thousand miles apart." It had long been evident that his field was too large for the personal oversight of one man: in February, 1881, Bishop L. R. Brewer arrived in Helena, to take charge of Montana, Bishop Tuttle retaining Idaho and Utah a few years longer. There were in Montana at that time 310 communicants, under the care of six priests. During Bishop Brewer's 35 years the communicants increased to 4,783. In 1914 the Reverend W. F. Faber was consecrated Bishop Coadjutor; becoming Diocesan upon Bishop Brewer's death in 1916. In 1920 the Right Reverend H. H. H. Fox came as Suffragan Bishop; in 1925 he was elected Coadjutor, with residence at Billings and jurisdiction of eastern Montana. In 1904 Montana ceased to be a missionary district and became a diocese. There are in it today 13 parishes, 48 organized missions, 10 missions and stations not yet organized.

Statistics for 1926 follow:

Number of ministers.....	26
Number of churches.....	71
Number of members.....	8,496
Value of church property.....	\$1,214,655
Average salary paid to ministers.....	\$1,800

Christian Science.

Christian Science was introduced in Montana as follows: In Butte, in 1893; Billings, Helena, and Missoula, in 1896; Bozeman, in 1897; Great Falls, in 1899; Anaconda and Libby, in 1900; Hamilton, in 1903; Kalispell, in 1907; Livingston, in 1909; Lewistown, in 1910; Miles City and Thompson Falls, in 1912. In addition to the foregoing the Christian Science Board of Directors of the Mother Church has recognized First Church of Christ, Scientist, Deer Lodge, and Christian Science Societies at Baker, Havre, Glendive, Columbus, Cascade, and Whitefish.

In the following places are to be found students of Christian Science, who gather regularly for worship and study: Big Timber, Bridger, Chester, Belt, Absher, Ekalaka, Forsyth, Gilford, Glasgow, Hinsdale, Judith Gap, Phillipsburg, Plains, Pelson, Roundup, Savage, Shonkin, Troy, Virginia City, Wisdom, Manhattan, and Tee Dee.

Christian Science has constantly grown in Montana. From time to time unorganized groups of Christian Scientists in different places have received official recognition by the Mother Church, until at the present time there are 21 such organizations in the State.

Evangelical Lutheran.

The first missionary of the Lutheran Missouri Synod was sent to Montana from Minnesota in March, 1884, and conducted services in the Court House at Helena.

In September, 1886, the first resident pastor of the Lutheran Missouri Synod came to Helena; in 1903 there were five resident pastors, in 1917 the number had increased to 27.

The best available figures for 1926 are:

Number of ministers.....	22
Number of churches.....	20
Number of communicant members.....	3,000
Value of church property.....	\$165,000
Average salary paid to ministers.....	\$1.087

The Methodist Episcopal Church South.

The Methodist Episcopal Church South was established in Montana during the years immediately following the Civil War by the Reverend L. B. Stateler, the Reverend E. J. Stanley and others.

Statistics for 1926 are given as follows:

Number of ministers in State.....	12
Number of churches.....	12
Number of members.....	1,088
Value of church property.....	\$119,200
Average salary paid to ministers.....	\$725

Seventh-Day Adventists.

The Seventh-Day Adventists have 26 churches located in different parts of the State. The state headquarters are at Great Falls. They conduct an Academy at Bozeman and have Church Schools at Great Falls, Missoula, Billings, and Kalispell. Their tithe in 1925 amounted to \$30,600; mission work totaled over \$18,000.

Number of ministers.....	10
Number of churches.....	26
Number of members.....	875
Value of property owned.....	\$60,000
Average salary paid to ministers.....	\$1,716

Disciples of Christ.

In Montana, the Disciples of Christ have churches at Anaconda, Billings, Bozeman, Butte, Corvallis, Belt, Conrad, Central Park, Deer Lodge, Fort Benton, Glasgow, Hamilton, Havre, Helena, Hysham, Highwood, Joliet, Kalispell, Great Falls, Miles City, Missoula, Moore, Polson, Ronan, Salesville, Whitehall and Turner.

The Rev. Walter M. Jordan is State Superintendent of Missions at Butte, Montana.

Number of Churches.....	27
Number of Ministers.....	18
Total number membership in state.....	3,855

All Lutherans.

The Lutheran World Almanac for 1921, places the total membership for all Lutheran churches in the State of Montana at 12,543. The membership of the church has increased and it is now believed that there are approximately 15,000 in the State. (See foot-note.)*

There are many churches in Montana with large membership not included in the above brief outline. Lack of space and lack of time prevents their appearance in these pages.

That Montana people gave heavily for charity in 1925 is evident. In 1925 the estimated deductions from income tax returns totaled \$1,500,000. It is evident that unreported contributions would greatly exceed this sum.

*A telegram from the Rev. A. M. Skindlov, Spokane, received just before going to press with this section of the Montana book, gives an estimate on the total number of Lutherans in Montana at 85,000.

LABOR ORGANIZATIONS



*First State Labor Federation Organized in 1895—Activities of Unions—
Outcome of Labor Laws of Montana.*



By Edwin H. Manson.



Power Dam at Great Falls.

No dependable record of the first steps taken by labor to form Trades Unions in Montana is available.

However, the first effort to combine the workers of the State in a body that would embrace all labor unions was taken in 1895, when the "State Trades and Labor Council of Montana" was organized. The state body was known by this name until January, 1908, when a charter was granted by

the American Federation of Labor to the Montana State Federation of Labor, by which name it has been known ever since.

The activities of the State Federation of Labor have been directed chiefly to increasing wages, improving working conditions, and the enactment of legislation for the protection of workers and their families.

Like all human movements everywhere, labor in Montana has had its vicissitudes, its successes and failures. The history of labor's achievements in Montana is a record of the State Federation, and the efforts it has put forth for the workers. It endeavors to unite all classes of wage-workers under one head, through their several organizations, that class, race, creed, political and trade prejudices may be abolished. The political opinions and the religious beliefs of every person are respected by the creed of labor; a man may belong to any political or religious organization, or to none, without criticism.

Purpose of Federation.

It is the purpose of the State Federation of Labor to so weld the various crafts together that each may give both moral and financial support to the other in times of stress or difficulty. In order to make this purpose effective, it undertakes to secure, in cases of boycotts, strikes, and lockouts, an attentive hearing before all affiliated bodies, and renders financial aid to the extent of its ability.

It is not a moneyed institution, but, on the other hand, it collects from its affiliated organizations barely enough for current expenses, leaving each of them in control of their own funds and permitting the establishment and maintenance of local benefits without interference. Each affiliated organization, in the light of experience, is allowed the utmost liberty in the conduct of its own affairs con-

sistent with the generally understood principles of labor. It is always watchful of the interests of the workers in the State Legislature, and endorses or protests in the name of labor when measures affecting them are introduced. As a result of its zeal in this direction, labor in Montana has always been free from competition with contract prison labor, so far as the State's penal institutions are concerned, and a law requiring the labeling or branding of prison made products offered for sale in this State is on the statute books. This law, it is believed, is pretty generally lived up to, although, as in everything else, there are occasional exceptions.

The State Federation of Labor is not opposed to the principle of labor for persons convicted of crime; on the contrary, it stands for their employment in the manufacture of articles for the State's use, under strict control.

Old Age Pension.

Montana was the second state in the Union to enact an old age pension law, and the first to put it into successful operation. Organized labor consistently urged this legislation for many years, and finally saw its enactment by the Eighteenth Legislature. In the contest for this legislation, the labor movement was ably supported by the Fraternal Order of Eagles, to whom much credit is due for the final enactment of the law.

Printing.

All the state printing, with one unimportant exception, must, by law, be printed in shops using the union label of the International Typographical Union, thus securing employment to many persons in the State which might otherwise go to outsiders.

Women in Industry.

Our laws for the protection of women wage-workers, while not altogether perfect, are many times better than similar laws in some of the other states, and were enacted at the behest of organized labor. Under these laws no woman may work more than eight hours in any one day, and working women are provided seats and other comforts totally lacking in most other states.

Child Labor.

Children under the age of sixteen years are entirely prohibited from all hazardous, unhealthy and immoral occupations, a statute enacted for the twofold purpose of preserving the health and morals of our youth, and giving them opportunity to secure an education.

Support to School.

Labor has given unstinted support to our schools, and has been an important factor in placing the State at, or near, the head of the list in matters pertaining to education. Free schools, free text books, and freedom of opportunity to prepare for the tasks of good citizenship has been the urge, and we pride ourselves on a comparison of results.

Compensation.

Workmen's Compensation laws, eliminating several features embodied in the principles of defense formerly used in suits for damages resulting in injury or death of employees, have been enacted, and, while not satisfactory to the workers, mark a long step forward. The most important features of this law follow: A maximum total payment for temporary total disability of fifteen dollars per week for a period of three hundred weeks; a maximum payment for permanent total disability of fifteen dollars for a period of five hundred weeks; compensation for injury causing death is paid to certain dependents, depending upon the relationship.

on a scale graduated down from fifty per cent of wages received by the deceased, to thirty per cent of such wages; but in all cases the payments are limited to a maximum of fifteen dollars per week and to four hundred weeks.

The age limit of minors who may receive benefits as dependents was raised by the last Legislature from sixteen years to eighteen years. Specific minor injuries are paid for periods ranging from two hundred weeks for the loss of arm, at or near the shoulder, to three weeks for loss of fourth finger at distal joint, all at a rate not exceeding fifteen dollars per week. Minimum compensation was increased by the last Legislature, and is now seven dollars per week in all cases. Medical and hospital services furnished are very liberal, the law providing that during the first six months after the happening of the injury the employer or insurer or the Industrial Accident Board, as the case may be, shall furnish reasonable medical, surgical, and hospital service and medicines needed, not exceeding in amount the sum of five hundred dollars. The law makes it elective to those engaged in agriculture, stock-raising and allied industries, to accept the provisions set forth in plans two and three, and upon complying with the statute are exempted from damages, under the common law or by statute.

Primary Election Laws.

Primary election laws as fair as any that have been devised by any of the states are on the statute books of Montana, insuring every qualified voter the right to take part in naming the candidates from governor to constable; and these laws, enacted through the efforts of organized labor and its progressive minded friends, are not in serious danger of repeal.

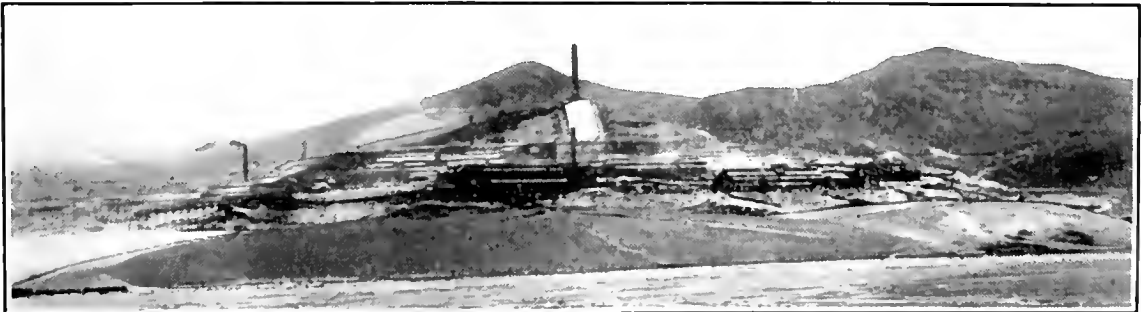
Equal Suffrage.

In the campaign to secure equal suffrage in this State, labor championed the cause of the women and worked incessantly until women were granted the right to vote on an equality with men.

In fact, labor has at all times supported progressive legislation, no matter by whom initiated.

Initiative and Referendum.

Labor, early in its history as a state organization, began to clamor for more equitable legislation affecting its members. It felt that if it could initiate legislation, thus bringing issues squarely before the electorate, it would have a better chance to secure their enactment than through a legislative body; hence, the agitation for the initiative and referendum. Of course, labor did not expect or wish to be the only ones to use these measures, and, indeed, they have not been. Some of the most useful and constructive laws on the statutes of Montana have been enacted through this method, so long and tenaciously fought for by the organized workers of the State.



The Largest Smelter in the World.

It has been clearly demonstrated that lack of organization among the unskilled vitally affects the wage and working conditions of organized skilled workers, and for that reason those who have been entrusted with the leadership of organized labor in this State have always held that no particular trade can long maintain wages above the common level and that to maintain high wages all trades and callings must be organized.

It is now a generally recognized fact that the worker is entitled to more than a bare living from the things produced by his toil. While it is true that the question of a "living wage" has never been settled to the satisfaction of either the employed or the employer, it is, nevertheless, not the debatable matter it once was. Immense added production as the result of installing machinery to do much of the work formerly done by manual labor, together with increased requirements in skill on the part of the worker, have changed conditions very materially within the last few years. Many employers have learned that the worker is not only the best, but the largest customer he has for his products, generally speaking, and that profits from him as an employee on the one hand, and as a customer on the other, should not be too large. Thus is being created a better understanding, and a finer spirit of cooperation between them, which, when brought to fruition, will banish the petty friction which, on occasion, brings injury to one or both parties.

Labor in its efforts to secure favorable legislation has almost always worked in the political organizations of the two old parties, although sporadic attempts to line it up with new political movements like the Socialist party and the Non-partisan League have been made with partial success. Under sane leadership labor has fought for what it believed were the best interests of Montana. Of course, it has made mistakes, as all men, and all groups of men, have done; but its desire, and the desire of those who have controlled its destiny, has been to create here a land of happy and contented homes, where honesty, industry and intelligence should form the basis of happiness and prosperity for all. Its struggles have been many, and some of them have been tinged with bitterness; some of them have been internal struggles, in which varying opinions of policy have fought for ascendancy. But withal, it has kept a fairly straight course, and today looks forward to the future with confidence that harmony will reign in its internal affairs, and to an increased degree, in its relations with those who employ it. Labor, with few exceptions, stands for the higher ideals of life, and, while it is ready at all times to forcefully agitate against evils which now exist, or which may arise in future in the industrial life of the State, it stands ready and willing to do its part in developing Montana into a Treasure State whose chief worth is a happy, prosperous citizenship.

As this is written (April 30th, 1926), there is a surplus of labor in Montana, but we are hopeful that a little later there will be room for more. What the State needs is more diversified industry and the capital to develop it. To those who have capital to invest, whether in manufactures, farming or livestock, Montana offers opportunity, and a hearty welcome.

STRIKES AND LOCKOUTS IN MONTANA

(Data by U. S. Department of Labor)

Number of Disputes Beginning Each Year						
1918	1919	1920	1921	1922	1923	1924
33	23	16	21	2	7	1

THE STATE FAIR



*First Fair Held in 1902—State Owns Spacious Grounds and Buildings—
Development of Agricultural Exhibits.*



By Virginia Campbell.



In 1902 Montana held its first State Fair financed by the State Government. The institution has grown to be one of the largest in the Northwest. A fair has been held continuously every year since the first official exposition.

The State purchased the original fair grounds and race track from Charles Hard of Helena who formerly leased the grounds to enterprising groups of citizens who financed and conducted "state fairs" prior to the time the official fair was held. Since the purchase of the original grounds the State has bought approximately 160 acres additional and added to the grounds. The institution is located one mile north of Helena. A spacious grandstand, agricultural hall, livestock exhibition buildings, auto hall, and manufacturers hall of ample size make up the equipment.

All of the departments of the Fair have grown tremendously since its establishment, but the greatest growth has been in the agricultural and livestock divisions. In 1925 the Fair management re-established the county collective agricultural exhibits, offering a large financial prize to first, second and third winners, and every county exhibiting took part in this contest.

An exhibit from Ravalli County, gathered together by C. Edson Smith, won the first prize in this division and the products thus exhibited were taken to the International Grain Show at Chicago, where they won all of the more important prizes offered in grains.

The finest livestock in the Middle and Northwest was exhibited at the Montana Fair in 1925. All states of the Northwest where herds of pure bred cattle are raised were well represented and the premiums paid were larger than ever before.

In past years such distinguished personages as former Presidents Woodrow Wilson and William H. Taft, the late James J. Hill, empire builder, and Howard Elliott, president of the Northern Pacific Railway Company, have visited the Montana State Fair and addressed the people of Montana.



A Band of Sheep.

CIVILIAN REHABILITATION



State Assists Disabled Persons—Furnishes Vocational Training for Persons With Physical Defects.



Montana's acceptance in 1921 of the Federal Vocational Rehabilitation Act placed the State with the progressive commonwealths that are restoring their industrial cripples to economic usefulness through practical training. The later enactment by our Legislature of a maintenance law raised our State to a high position among these states and stamped Montana as a leader in the field of social reconstruction.

Rehabilitation is the process through which the physically disabled are taught a trade and placed in employment in harmony with their disabilities. By Act of Congress, approved by the President, June 2, 1920, the United States Government established the principle that the nation as a whole has the responsibility in this work and made a continuing appropriation to make rehabilitation effective throughout the country. Montana's share of this appropriation is \$5,213.96 annually, and to this sum the Legislature has added \$15,000, which makes available each year \$20,213.96 for rehabilitation purposes in this state.

Under the plan of rehabilitation, all persons of employable age who, by reason of some physical defect or infirmity, whether congenital or acquired through accident or disease, are totally or partially incapacitated for remunerative employment are eligible for vocational training. Training is made as short and practical as is consistent with the employment objective in view. This objective is determined by the State Rehabilitation Bureau after consulting with the applicant, whose age, education, intelligence, preferences and occupational experience are deciding factors. Schools, shops, factories and other industrial establishments are utilized for training. All expenses, such as tuition, books, tools and other necessary supplies are paid by the state. Under the provisions of the maintenance law, to which reference is made in the opening paragraph, a small monthly allowance may also be made to persons in training to assist them with their living expenses while in training. This allowance is not granted unless it is absolutely necessary to enable an applicant to avail himself of training and cannot exceed \$30.00 per month to a single person or \$50.00 per month to a married person, nor can it, in any case, continue for a longer period than eight months. The broader training policy made possible by the maintenance law has operated to the advantage of the state and disabled alike.

Civilian Rehabilitation is not charity. To assist a disabled person back upon his feet and restore him to industrial productiveness is just as valuable to the state as it is to the man or woman assisted. The State is making producers of non-producers. It is restoring self-respect, self-reliance and hope to citizens who have lost these things. In dollars and cents rehabilitation pays. In its effect on the moral and spiritual fabric of the person served, it pays still more. It is essentially a measure of conservation and economy.

OUR NATIONAL GUARD



First Battalion of Volunteers Organized for Nez Perce Indian War in 1877—Montana Now Has One Regiment of Infantry.



The Adjutant General's office is charged with all administrative work in connection with the National Guard of the State, the keeping of all records pertaining to the ex-service men from Montana, and the actual control of the National Guard when not in the service of the United States.

The first record of National Guard troops in this State covers the battalion of volunteers organized for the Nez Perce Indian War July-August, 1877. This battalion was organized in Butte, and southern Deer Lodge county and was commanded by the late Senator W. A. Clark, and was called the 1st Battalion, Montana Volunteer Militia.

The War With Spain.

Montana National Guard troops saw service in the war with Spain, being mustered in on May 9, 1898, at Helena, Montana, as the 1st Regiment of Montana Infantry. This regiment was sent to the Philippine Islands and was mustered out on October 17, 1899.

After the war with Spain the regiment was reorganized as the 2nd Regiment and on June, 1916, was ordered to the Mexican border for service. The regiment saw active service from June, 1916, until November 3, 1916, when it was mustered out of Federal service at Fort Harrison, Montana.

In the World War.

On March 25, 1917, the regiment was again ordered to active duty by the President of the United States and this time for the coming World War. The regiment was mobilized at Fort Harrison, Montana, and was placed on duty guarding the public utilities of the State. On August 5, 1917, the name was changed from 2nd Montana Infantry to the 163rd Infantry and in November, 1917, the troops were sent to a port of embarkation for duty overseas. The regiment was in France until the spring of 1919 when it was sent home and mustered out.

In the United States we now have the "National Defense Act" which divides our defensive land forces into Regular Army, National Guard and Reserve Corps. Under this Act Montana is now allotted one regiment of infantry and it is called the 163rd Infantry. This regiment is now fully organized and equipped and consists of 9 rifle companies, 3 machine gun companies, 3 battalion headquarters companies, 1 regimental headquarters company, 1 service company, 1 howitzer company and a medical detachment, making 19 companies in all.

Under the National Defense Act the Federal Government has certain control over all National Guard troops in the United States, furnishes all equipment needed and pays the officers and men for drills, and encampments. The states provide armories or drill halls, maintains an Adjutant General's office and pays for physical examination of all recruits, etc. Under this Act the National Guard is placed with the Regular Army as our first line of defense in case of a National emergency.

STATE EQUALIZATION BOARD



*Aggrieved Tarpayer Has the Right of Appeal to County and State Board—
Organization of State Agency.*



Until February 2, 1923, the State Board of Equalization consisted of the Governor, Attorney General, Secretary of State, State Treasurer, and State Auditor, who were ex-officio members of the State Board of Equalization, and whose duties consisted primarily of equalizing taxes and the assessment of inter-county property.

The Legislature of 1921 greatly increased the duties of the Board of Equalization by the passage of the following license tax laws: gasoline license tax law (refineries, distributors, and dealers), coal license tax law (miners and dealers), cement license tax law (manufacturers and dealers), oil production license tax law (producers), metalliferous-mines license tax law.

The responsibility of the administration of these laws and also the determinations of the inheritance tax and the corporation license tax, the duties of assessing the net proceeds of mines rests with the State Board of Equalization. These additional duties imposed upon the Board made it eminently necessary that a State Board of Equalization be created that could devote its entire time to matters of taxation, and accordingly the Legislature of 1921 submitted to the voters of the State an Amendment to the Constitution, "Providing for a State Board of Equalization consisting of three members to be appointed by the Governor and approved by the senate."

This amendment was voted at the general election of 1922 and passed by a substantial majority. The Legislature enacted Chapter Three of the Session Laws of 1923, fixing the terms and salaries of the State Board of Equalization, prescribing its powers and duties, and repealing certain sections of the Revised Codes of Montana of 1921. The act was approved by the Governor on February 2, 1923, and on the same day he appointed the following persons to act as members of this Board:

A. J. Violette, whose term of office expired March 1, 1925.

O. A. Bergeson, whose term of office will expire March 1, 1927.

J. W. Walker, whose term of office will expire March 1, 1929.

J. H. Stewart of White Sulphur Springs was appointed for a six year term to succeed A. J. Violette.

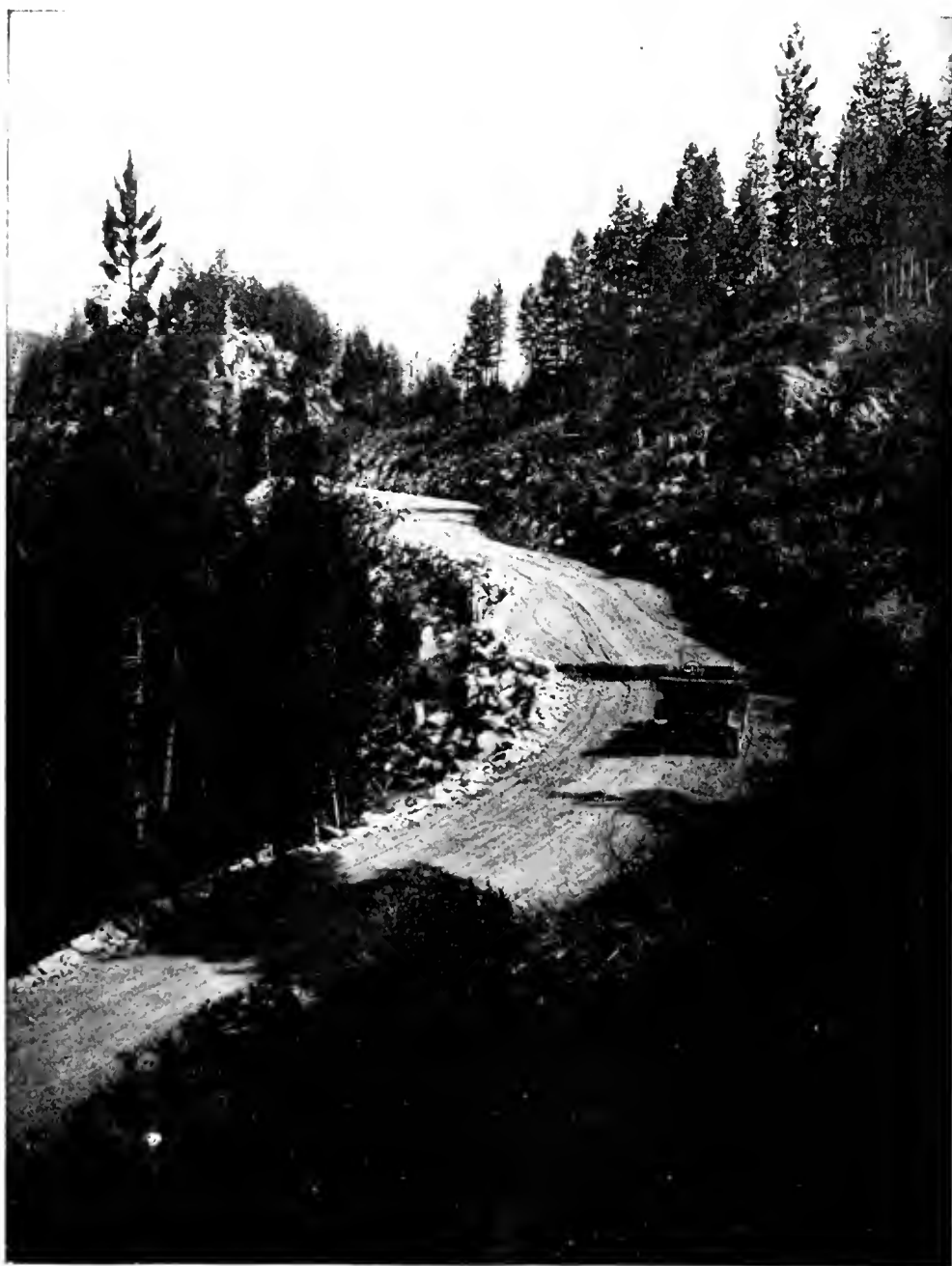
Assessments Made.

In addition to the administration of the several license tax laws of the State, it is the duty of the Board to assess the net proceeds of mines, metal, coal and oil, and to certify the same to the County Clerks of the counties in which the property is located; to assess the continuous inter-state and inter-county property of all public utilities, such as railroads, telegraph and telephone lines, and hydro-electric power lines, to apportion the same to the several taxing districts, and to certify the same to the County Clerks of the counties in which the property is located; "to have and exercise general supervision over the administration of the assessment and tax laws of the State, and over Assessors, County Boards of Equalization, Boards of County Commissioners, and other officers of municipal corporations having any duties to perform under any of the laws of this State relating to taxa-

tion, to the end that all assessments of property be made relatively just and equal at true value in substantial compliance with law; to supervise the administration of all revenue laws of the State and assist in their enforcement"; and also to hear and act on appeals from the County Boards of Equalization.

Methods of Appeal

If any taxpayer is aggrieved at the assessment placed upon his property by the County Assessor he can appeal to the County Board of Equalization, which meets on the third Monday in July and remains in session until the second Monday in August. If he is still not satisfied with the action of the County Board of Equalization he may appeal to the State Board of Equalization by filing with the County Board a notice of appeal and a duplicate and affidavit with the State Board of Equalization within five days after the action of the said County Board.



One of the Excellent Mountain Roads.

COMMERCIAL MONTANA



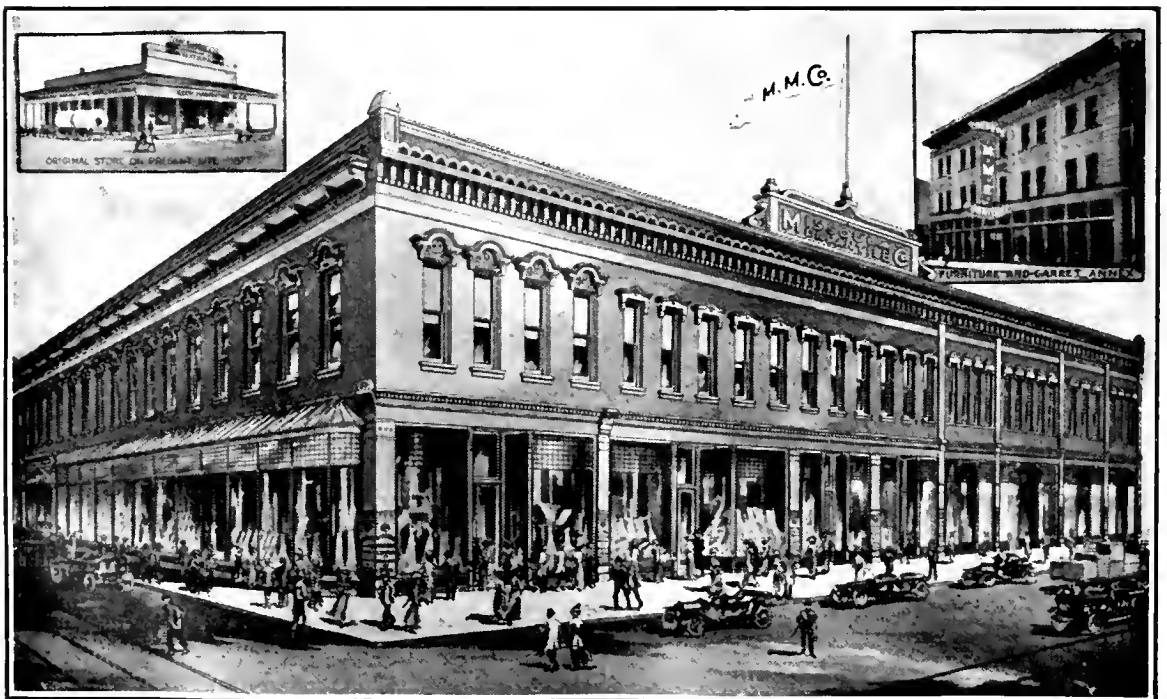
*Many Firms in Business 60 Years Ago Still on R. G. Dun's Records—
Commercial Failures Fewer in 1925 Than Other Recent Years.*



It is hard to realize as we view Montana with the eyes of Today that it is only a little more than sixty years ago that the first mercantile establishments were opened for business in the then Territory of Montana. The first authentic record is that of R. G. Dun and Company, who first compiled and published a list of Montana merchants in 1867—four years after Alder Gulch was discovered. While this list was not complete, it is interesting to note that it showed 82 mercantile houses located in eight towns, the greater number being in Helena and Virginia City; a number of the merchants operating stores in both places, thus taking advantage of the trade of the two great gold camps, Alder and Last Chance Gulches, the latter being the present site of Helena.

In 1875 Dun listed in Montana 292 merchants, located in 50 towns and villages. Many of the towns and villages mentioned in this directory are no longer in existence, having been moved away or deserted when the ore bodies which were responsible for their foundation were worked out, or ceased to pay large returns.

The majority of the merchants operating in the seventies were very successful and some of the names appearing in the directories then are to be found in the directory of today.



Large Western Montana Commercial Institution.

Comparison for three years on commercial failures and liabilities follows:

MONTANA FAILURES, MERCANTILE
(Data by R. G. Dun and Company)

YEAR	Number of Merchants	Number of Failures	Assets	Liabilities
1922	10,621	224	\$2,091,566	\$3,357,117
1923	10,696	216	1,873,927	2,828,393
1924	9,749	166	1,256,483	2,015,033
1925	9,694	164	963,045	1,580,834

Modern Stores the Rule.

Montana now has some of the most modern mercantile establishments of the West, and the newcomer should not expect to locate where he will have no competition or even poor competition. In all the leading cities of the State there are modern department stores of large size, and well selected stocks of merchandise. There also are specialty shops for the fastidious buyer, as well as hardware, automobile, and many other lines. And in the smaller towns there are general stores well equipped to care for the needs of their customers. Openings for newcomers will be found in many of the rapidly growing and prosperous towns and cities, but the prospective new merchant will do well to study conditions locally to ascertain which communities have the resources to accommodate other business houses.



Interior of an Eastern Montana Store.

Classified Commercial Census.

In this connection the following table, prepared from the 1926 commercial census of Montana taken a few weeks ago by R. G. Dun and Company, is not only interesting but of great value in determining which counties are well supplied with various mercantile lines:

R. G. DUN'S 1926 COMMERCIAL CENSUS OF MONTANA

COUNTY	Genl. Mdse.	Gro. & Meat	Confec. Cigars Etc.	Ele- vators	Lum- ber	Auto & Gar.	Misc.	Total
Beaverhead	14	20	25	6	5	20	54	144
Big Horn	22	9	26	4	4	15	33	113
Blaine	29	11	19	12	8	13	34	126
Broadwater	12	5	10	5	2	5	16	55
Carbon	42	29	44	12	8	21	62	218
Carter	11	3	7	.....	3	5	7	36
Cascade	28	119	110	21	12	64	417	771
Choteau	22	14	37	29	10	16	26	154
Custer	23	33	34	9	7	30	73	209
Daniels	17	8	22	16	9	15	26	113
Dawson	26	19	28	8	5	18	56	160
Deer Lodge	9	49	46	.....	2	27	65	198
Fallon	10	7	18	7	3	8	28	81
Fergus	44	36	61	43	15	39	144	382
Flathead	22	45	56	6	22	29	156	336
Gallatin	20	37	47	25	11	37	160	337
Garfield	10	9	6	1	1	5	6	38
Glacier	12	13	22	3	4	11	17	82
Golden Valley	9	4	7	4	7	5	9	45
Granite	8	8	19	1	.....	6	19	63
Hill	26	27	35	12	2	23	61	189
Jefferson	15	6	23	1	2	10	16	73
Judith Basin	17	12	15	35	9	10	20	118
Lake	28	11	32	11	6	15	41	144
Lewis & Clark	28	55	64	5	5	36	209	402
Liberty	7	3	5	5	1	3	12	36
Lincoln	23	19	20	1	6	13	46	128
McCone	12	1	8	1	.....	4	8	34
Madison	18	12	25	3	7	15	31	111
Meagher	10	6	16	3	4	10	13	62
Mineral	14	9	17	.....	.....	11	12	63
Missoula	18	62	60	4	13	48	166	371
Musselshell	20	23	20	6	4	22	55	159
Park	15	24	46	11	4	27	111	238
Petroleum	4	3	10	3	2	4	11	37
Phillips	25	19	13	9	6	12	42	126
Pondera	12	8	15	15	6	13	32	101
Powder River	13	.....	3	.....	1	1	2	20
Powell	10	11	23	1	2	12	41	100
Prairie	5	4	9	5	4	8	18	53
Ravalli	17	16	26	4	4	18	74	159
Richland	16	14	25	14	9	9	53	140
Roosevelt	28	12	38	17	8	19	93	215
Rosebud	19	9	25	13	4	11	39	120
Sanders	22	6	25	2	5	14	33	107
Sheridan	25	12	40	29	12	21	73	212
Silver Bow	16	296	184	6	7	62	497	1068
Stillwater	21	12	15	12	4	13	35	112
Sweet Grass	7	6	11	3	2	9	23	61
Teton	18	8	18	21	6	11	36	118
Toole	21	16	41	13	9	15	52	167
Treasure	5	1	2	2	3	2	4	19
Valley	24	20	25	15	9	18	74	185
Wheatland	13	8	19	12	6	11	41	110
Wibaux	5	3	6	8	4	4	13	43
Yellowstone	29	88	81	20	21	80	276	595
Totals	996	1320	1693	534	340	1003	3771	9657

In 1880, according to Dun's records, there were 515 merchants in Montana. Since then the growth has been very rapid. In 1885 there were 1,954 merchants; in 1890, 2,905; in 1900, 3,390; in 1910, 6,476. The above table indicates the number by counties in 1926.



Eastern Montana Retail Establishment.

Following is a table showing the net worth of Montana merchants:

MONTANA MERCHANTS NET WORTH
(Data by R. G. Dun and Company)

Net worth	\$200,000 to \$1,000,000	1925
Net worth	50,000 to 200,000	145
Net worth	20,000 to 50,000	751
Net worth	5,000 to 20,000	516
Net worth	500 to 5,000	1493
Net worth	indeterminate	2940
		4249



Central Montana Mercantile Establishment.

BANKS AND BANKING



*During the Past Year Deposits in Montana Banks Increased \$8,388,168—
Strength of Financial Institutions—Total Deposits
Now \$150,969,151.*



Perhaps nothing better demonstrates the intrinsic soundness of Montana than the fact that during the past year deposits increased from \$142,580,983 to \$150,969,151. Bank deposits in 1924 were \$256.90 per capita, compared with \$272 per capita at the end of 1925.

Montana's 145 state and two private banks gained \$5,131,168 in deposits from December 31, 1924, to December 31, 1925, according to the Department of Banking for the State of Montana.

Here are the figures prepared by the State Department of Banking on state banks:

STATE BANKS

1924

Number State Banks Reporting December 31, 1924.....	154
Total Deposits	\$68,484,983.00
Average Deposits	444,707.00

1925

Number State Banks Reporting December 31, 1925.....	147
Total Deposits	\$73,616,151.00
Average Deposits	500,790.00

Montana's 80 National banks gained \$3,257,000 in deposits from December 31, 1924, to December 31, 1925. The figures on National Banks are given below:

NATIONAL BANKS

1924

Number National Banks Reporting December 31, 1924.....	91
Total Deposits	\$74,096,000.00
Average Deposits	814,242.00

1925

Number National Banks Reporting December 31, 1925.....	80
Total Deposits	\$77,353,000.00
Average Deposits	966,912.00

For the purpose of comparison the following table is given showing deposits of Montana banks 10 years ago (1915):

MONTANA BANKS IN 1915

Number State Banks Reporting December 31, 1915.....	235
Total Deposits	\$62,976,768.00
Average Deposits	267,986.00
Number National Banks Reporting December 31, 1915.....	66
Total Deposits	\$51,159,000.00
Average Deposits	775,137.00
Total Deposits State and National Banks, December 31, 1915.....	\$114,135,768.00
Total Deposits State and National Banks, December 31, 1925.....	150,969,151.00

It is also significant that the total of all sums borrowed by these banks from all sources, as shown by the last call, September 28, 1925, is only \$1,683,000, while on October 10, 1924, the borrowed money of all the banks totaled \$3,177,000.

The Products of Montana 1925

The total value of all raw wealth produced in the State of Montana in 1925 is estimated by the Division of Publicity, Department of Agriculture, Labor and Industry at \$323,898,236.

This is at the rate of \$580.25 for every man, woman and child in the State based upon an estimated population in October, 1925, of 555,617.

The total value of all farm crops are estimated by the United States and Montana Departments of Agriculture to be \$110,190,000. Wheat yielded 34,601,000 bushels valued at \$48,243,000.

Livestock and its products are valued at \$65,173,000. Beef cattle sold, brought to the State \$26,477,000. Milk and milk products, butter and cheese, contributed an estimated total of \$8,859,000.

The gross value of the products of all metal mines is placed at \$66,000,000, an increase of \$10,251,043 over 1924.

Manufacturing establishments such as sugar mills, flour mills, smelters, etc., added values of \$51,500,000 to raw materials. The lumber industry brought \$14,350,000 in additional revenue. Montana's oil wells produced more than 4,000,000 barrels of crude oil, valued at \$6,023,876, an increase of more than thirty per cent over 1924. Coal mines produced 3,185,739 tons valued at \$9,161,360. (See page 48 for detailed table.)

In the next pages each of the industries of the State of Montana will be briefly described, and the possibilities for future development outlined.

The variety of Montana's products again illustrates the size and diversified resources of the State.

The Products of Montana

1925

Products of Farms	a/	\$110,190,000
Wheat	\$ 48,243,000	
Corn	6,255,000	
Oats	7,608,000	
Barley	2,358,000	
Rye	1,036,000	
Flax	2,684,000	
All Hay	25,613,000	
Potatoes	6,048,000	
Apples	140,000	
Beans	1,525,000	
Peas	1,265,000	
Sugar Beets	3,080,000	
Alfalfa Seed	1,225,000	
Other Crops	3,080,000	
Livestock	a/	\$ 65,173,000
Beef Cattle	\$ 26,477,000	
Sheep and Lambs	9,926,000	
Wool	9,156,000	
Milk and Milk Products, Butter, Cheese.....	8,859,000	
Hogs	5,685,000	
Poultry and Eggs	3,500,000	
Honey	250,000	
Horses	1,320,000	
Metal Mines		\$ 66,000,000
Manufacturers		51,500,000
Lumber		14,350,000
Coal Mines		9,161,360
Oil		6,023,876
Fish and Fur Products		1,500,000
TOTAL VALUE OF ALL PRODUCTS		<u>\$323,898,236</u>

a/ As between value of crops raised and value of livestock and its products sold there is a certain amount of duplication in value due to portions of crop production being fed to livestock and thus counted again in the value of livestock sold. It is estimated that of the \$110,190,000 value of crops produced that \$57,360,000 worth of crop production is sold, or will be sold by Montana farmers. The difference will represent both the value of products fed to livestock as well as the amounts consumed on the farm or obtained as seed.

Montana in 1925 produced at the rate of \$580.25 per capita.

PRODUCTS LEAD WORLD



*Distinguished Recognition as Long Ago as Chicago Exposition of 1893—
New International Records in Prize Winning at Chicago in 1295.*



A Montana Wheat Field.

The products of Montana's farms, mines, manufacturing establishments and timber reserves have been in the front rank of prize winners wherever and whenever exhibited in competition with the products of other commonwealths.

As long ago as the Chicago Exposition of 1893, besides mining awards for gold nuggets, crystals and placer gold, for copper ores

and for building stone, this State won distinguished recognition for its agricultural products, awards being made to Montana on apples, flax-seed, oats, and hay.

At the Louisiana Purchase Exposition, held at St. Louis in 1904, the grand prize for the mining industry was won by the State of Montana. For agricultural exhibits from Montana there were received sixty-nine gold medals, sixty-two silver medals and fifty-three bronze medals.

At the Lewis and Clark Centennial Exposition held at Portland, Oregon, in 1905, Montana was awarded the gold medal for an educational exhibit, a gold medal for a collective exhibit of grains and grasses, and two gold medals for mineral exhibits.

Out of twelve sweepstakes offered at the Dry Farming Congress in Tulsa, Oklahoma, in 1913, Montana won four. The significance of this victory can be appreciated when it is understood that these prizes were competed for by products from every section of the continent.

The superiority of many of Montana's products was again demonstrated in 1915 at the California Expositions. A recapitulation of Montana's winnings at the Panama-Pacific International Exposition, San Francisco, 1915, and at the Panama-California Exposition at San Diego, 1915, follows:

	Grand Prize	Medal of Honor	Gold Medals	Silver Medals	Bronze Medals	Honorable Mention
Agriculture, P. P. I. E.	1	12	77	240	199	98
Miscellaneous ..... - .....	....	....	1	3	8	1
San Diego	1	....	15	.....	.....	....
Horticulture, P. P. I. E.	1	1	10	27	17	14
Total..... ..	3	13	103	270	224	113
Grand Total	726 Awards					

With only 100 entries at the 1921 International Hay and Grain Show at Chicago, Montana won 38 prizes, including four first and three second prizes in world competition, 15 out of 18 firsts for hard red winter wheat, five out of the first nine prizes for Durum wheat, the world cup for the best peck of any wheat, and first for an exhibit of six-row barley.

At the 1921 International Potato Show at Duluth, with only one Montana entry, she won second place in the International Championship Association potato display.

In 1922 Montana won 43 places at the International Grain Show at Chicago, and 60 places in 1923; it took first in hard red winter wheat, took first and sweepstakes in the Durum class, second in white Dent corn, and third in yellow Dent.

Last year, 1925, the Treasure State at the Chicago International Hay and Grain Show set a new international record in prize winning, with 105 premiums.

The list includes world sweepstakes in all wheat and in Durum red wheat, first place and sweepstakes in six classes. Montana's successes are enumerated as follows:

Soft red winter wheat, two premiums. Durum red wheat, world sweepstakes and 13 premiums out of a possible 20. All wheat, world sweepstakes. Reserve white spring wheat, 8 premiums out of 15.

White oats, first and sweepstakes with 11 premiums out of 25.

Early oats, first and sweepstakes.

Rye, 7 premiums out of 9.

Two-row barley, first and sweepstakes, 7 premiums out of a possible 9.

Six-row barley, first and sweepstakes, 4 out of 25.

Treble barley, first and sweepstakes, 6 out of 9.

Timothy sudan, first and sweepstakes.

Boys' Corn Club, Flint, three premiums; yellow corn, three premiums; white Dent, first prize and three premiums.

Other premiums on beans.

The Commissioner of Agriculture, Labor and Industry has supervision of all exhibits of the State at fairs and expositions. This is true at the State Fair held each year at Helena, and at exhibits outside the State.

Montana will be represented this year (1926) at the Pacific Northwest Commercial and Industrial Exposition to be held at Chicago in November.



Freak Limestone in Carter County.

Montana's Greatest Asset

Montana from the outset has richly rewarded many who came to her seemingly regardless of what request was made. Her very first explorers in quest of fur and game found her a lavish host. Later the miner in search of precious metal found her rich in hidden treasures of gold, silver and copper. Finally the stockmen, followed by the farmer, have uncovered such a wealth of agricultural resources that today they tower above any of the other resources of the State, rich as Montana is in metals, coal, oil and lumber.

Men have sought wealth and found it in Montana; have sought health and found her climate rich in the qualities that make for sturdy manhood and womanhood. Thousands annually seek recreation within her spacious domain, finding wholesome and delightful companionship with her mountains and valleys, her woods and her plains under the topaz of her summer skies.

But her farmers came to build homes, to acquire ownership of land under generous terms, to lay the foundations of her successful and satisfied farming, which is the very basis and bulwark of American ideals.

Montana today has approximately 47,000 farms which are valued at \$453,345,643, including \$66,255,825 worth of buildings and improvements. The average total value of each farm is \$9,686. Compared with 1900, the data shows that at that time the number of farms was 13,370, valued at \$117,859,823.

The huge investment in Montana agriculture today in itself is testimony to the fact that agriculture has succeeded, and in relation to the status of the industry in 1900 has succeeded in spite of draw-backs and set-backs in the way of securing the high type of farmer that Montana needs and wants.

Of total land in farms of more than 30,000,000 acres, less than 7,000,000 acres of these lands were in crops last year, and yet a total of more than \$110,000,000 worth of farm produce was grown in that year and more than \$65,000,000 worth of livestock and livestock products were marketed.

Montana agriculture has not yet found its stride as the basic data cited above indicates.

The history of the development of farming in Montana as well as the possibilities of its further development are outlined in the pages following.

MONTANA: RESOURCES AND OPPORTUNITIES

MONTANA FARMS AND FARM PROPERTY 1870 TO 1925

	1870	1880	1890	1900	1910	1920	1925
Number of farms	851	1,519	5,603	13,370	26,214	57,677	46,901
Percent increase° .....	.....	78.5	269.9	138.6	96.1	120.0	°18.7
Total land area	93,564,000	93,568,640	93,568,640	93,568,640	93,568,640	93,523,840	93,523,840
All land in farms	139,537	405,683	1,964,197	11,844,454	13,545,603	35,070,656	32,740,442
Percent increase° .....	.....	190.7	384.2	503.0	14.4	158.9	.....
Improved land in farms	84,674	262,611	915,517	1,736,701	3,640,309	11,007,278	12,596,166
Percent increase° .....	.....	210.1	248.6	89.7	109.6	202.4	.....
Percent all land in farms	0.1	0.4	2.1	12.7	14.5	37.5	.....
Percent land improved	60.7	61.7	46.6	14.7	226.9	31.4	.....
Average acreage per farm	161.0	267.1	350.6	885.9	516.7	608.1	698.1
Average improved acreage farm	99.5	172.9	163.4	139.9	138.9	190.8	.....
Value of all farm property (dollars)	2,154,659	12,806,213	60,135,102	117,859,823	347,828,770	985,961,308	a/
Percent increase .....	.....	494.4	369.6	96.0	195.1	183.5	.....
Value farm livestock (dollars)	1,454,494	9,170,554	33,286,752	52,161,833	85,663,187	154,189,557	a/
Percent increase .....	.....	530.3	262.8	56.8	64.2	80.0	.....
Value farm land and buildings (dollars)	583,355	3,234,504	25,512,340	62,026,090	251,625,930	776,767,529	453,345,643
Percent increase° .....	.....	454.5	688.7	143.1	305.7	.....	°

(°) Increases except where marked ° (decreases), a/ comparable data from 1925 census not yet available. Source of data cited above is United States census taken decennially by the Federal Department of Commerce including such results of 1925 Special Census of agriculture available to date.

Prepared by U. S. Division of Crop Estimates, cooperating with the State Department of Agriculture.

AGRICULTURAL DEVELOPMENT



Eighty Years Have Elapsed Since First Ground Seeded to Grains in Montana—Picture of Present Day Agriculture.



By J. G. Diamond.

About 80 years have elapsed since Father DeSmet, a Catholic missionary to the Indians, seeded a parcel of ground to grains and vegetables at St. Mary's Mission in the Bitter Root Valley, near the present site of Stevensville, constituting what is generally conceded to have been the first husbandry by white men in Montana. This was in 1845, and during the next 20 years a few more farms were established in the same valley. Although records of agriculture appear as early as 1865, the first comprehensive survey of agriculture was that of the Federal Census of 1870, which found 851 farms in the territory. The total land embraced in these farms was 139,537 acres, less than one-tenth of one per cent of the State's total area.

The growth of the State's agricultural area during the successive decades from 1880 to 1925 was a series of big increases starting with 405,833 acres in 1880 and increasing 384.2 per cent by 1890; 503 per cent by 1900; 14.4 per cent by 1910; 158.9 per cent by 1920, when the peak of 35,070,656 acres or 37.5 per cent of the total land area was in farms. Between 1920 and 1925 the most recent Federal Census data shows a slight decline to 32,740,442 acres, due to post-war difficulties of agriculture generally.

Prior to 1890 agriculture was largely that of stock raising. The period 1890 to 1900 saw a large expansion of farm lands and some development of grain farming although still mostly confined to irrigated lands. It was during the next 20 years that the great expansion on non-irrigated lands took place and farming from a place subsidiary to the industry of stock raising became a competitor of increasing importance. During this period wheat acreage from 88,896 acres in 1900 with a production of 1,488,000 bushels, by 1920 had grown to 2,787,000 acres with a production of 28,690,000 bushels. A few years later the wheat crop (1922) had passed the production mark of 50,000,000 bushels. Similarly other grain and forage crops made marked development during this period, the latter years of which saw the introduction of such crops as seed and canning peas, edible beans, special seed crops and small fruit crops. Sugar beets came a little earlier and corn acreage although assuming importance only during the past five years had been carried along with some development all through this period, its record as a matter of fact beginning in 1882 almost as early as wheat acreage records.

The advent of the settler and the homesteader and the encroachment of the farm on the range occurred principally in the period of 1900 to 1920. With farms competing for the best land and water privileges and the increase in land values accompanying a settlement period, it would seem that such encroachment must have been to some extent at the expense of the stock raising industry. It is true that stockmen did find a changed order with the coming of the homestead settler that to a large extent has eliminated the huge herds and bands of the old range days. However, the importance of stock-raising from the standpoint of the whole State was maintained and in some cases increased during this period.

**NUMBER OF FARMS, LAND IN FARMS, VALUE OF ALL FARM PROPERTY AND
VALUE OF LAND ALONE—BY COUNTIES—1925**

Counties and Districts	Number of Farms	Land in Farms Total Acres	Value of all Farm Property	Value of Land Alone
NORTHWESTERN				
Flathead	1,238	262,984	\$10,571,071	\$ 8,382,510
Lincoln	583	99,356	2,219,935	1,730,750
Lake	964	244,589	6,873,392	5,588,177
Sanders	669	236,030	4,384,073	3,507,393
NORTH CENTRAL				
Blaine	1,135	1,504,038	13,263,663	11,978,473
Chouteau	1,649	1,176,377	11,732,151	10,260,621
Glacier	345	1,061,310	1,547,490	1,137,915
Hill	1,419	808,251	7,959,943	6,788,318
Liberty	446	317,813	3,402,743	2,995,293
Pondera	792	532,466	10,094,439	8,950,929
Teton	1,089	813,740	12,691,652	11,265,342
Toole	597	470,804	4,983,159	4,307,233
NORTHEASTERN				
Daniels	1,020	505,066	6,535,387	5,414,012
Phillips	1,427	870,349	8,101,540	7,206,025
Roosevelt	1,267	754,441	8,172,635	6,921,240
Sheridan	1,487	731,778	11,628,927	9,518,676
Valley	1,925	1,109,017	12,770,347	11,094,587
WEST CENTRAL				
Deer Lodge	93	77,506	1,576,234	1,300,884
Granite	227	184,393	3,122,885	***
Mineral	103	26,270	550,485	399,624
Missoula	673	207,611	6,230,545	4,959,422
Powell	360	570,888	8,566,684	7,391,224
Ravalli	1,039	207,211	12,459,691	***
CENTRAL				
Broadwater	321	260,279	5,302,739	***
Cascade	1,257	1,058,147	17,341,471	14,832,918
Fergus	1,918	1,346,699	26,440,359	24,000,199
Golden Valley	492	313,345	3,815,989	3,259,031
Jefferson	446	220,553	3,854,230	3,138,146
Judith Basin	786	656,824	16,280,236	14,661,151
Lewis & Clark	543	793,536	9,681,210	7,954,843
Meagher	310	802,227	8,287,429	7,571,054
Musselshell	650	492,421	4,657,689	4,028,569
Wheatland	386	491,412	6,590,525	5,852,765
EAST CENTRAL				
Dawson	1,105	736,538	9,547,887	8,095,776
Garfield	1,312	710,333	5,000,282	4,349,937
McCone	1,072	593,547	6,475,546	5,556,636
Prairie	560	521,006	4,736,339	4,112,054
Richland	1,429	692,086	10,194,498	8,525,810
Wibaux	466	263,198	4,419,127	3,684,907
SOUTHWESTERN				
Beaverhead	790	1,008,930	15,671,148	13,746,395
Madison	715	587,442	10,795,284	9,304,234
Silver Bow	180	75,847	1,202,540	863,615
SOUTH CENTRAL				
Carbon	1,095	399,154	10,644,881	8,959,526
Gallatin	1,026	443,145	18,274,934	15,432,809
Park	619	666,059	10,408,482	8,630,491
Stillwater	946	607,083	9,003,800	7,709,624
Sweet Grass	632	689,546	8,239,661	***
Yellowstone	1,960	688,108	17,859,840	14,551,265
SOUTHEASTERN				
Big Horn	1,260	1,164,302	9,184,789	8,050,200
Carter	770	873,404	4,911,130	4,133,390
Custer	716	935,151	6,986,281	5,776,584
Fallon	659	591,749	6,171,627	5,301,647
Powder River	838	828,275	5,593,762	4,935,387
Rosebud	792	1,431,802	11,482,987	10,495,097
Treasure	299	221,188	2,835,110	2,464,070
STATE TOTAL	46,901	32,740,442	453,345,643	387,089,818

*** Data incomplete at time of tabulation.

Table prepared by U. S. Division of Crop and Livestock Estimates cooperating with the State Department of Agriculture.

In the case of cattle, total numbers in 1900 were 975,000 head, which numbers were practically maintained during the first decade ending 1910. From 1910 to 1926 the total increased to 1,280,000 head.

The picture of the State's agriculture at present is an interesting one, the older programs of stock raising and wheat raising are still of major importance although new methods have come to meet the new conditions whereby we find side by side with the old order the smaller diversified farms with hogs, dairy cattle, corn, and other cultivated crops, of sugar beets, beans, peas, and seed crops. There are still, however, large wheat farms and large stock ranches, but the wheat farms are becoming diversified with other interests that lessen the risk of a single crop and the trend of stock raising is toward larger numbers on fenced farms and ranges.

In her agricultural development from that of a frontier state to that of an important contributor among the Nation's surplus producers of farm and live stock products, Montana has had to meet and solve many problems that would have discouraged men of less vision and courage than those who fortunately were her pioneers. Hazards of climatic conditions in various regions of the State, and adaptability of these regions to the types of farming the settlers brought with them, could only be learned from experience that is often costly. The period 1913 to 1920 was a period in which perhaps the greatest store of knowledge of Montana conditions was accumulated. A big settlement movement was under way at the beginning of this period following a big grain crop in 1912 and continuing through a series of favorable years that culminated in the unprecedented high average yields of 1915 and 1916. Then followed in succession a series of dry years ending in the extremely dry season of 1919, which, from all available records, appears to have been without precedent.

While costly to the men and women who went into the new regions during the early part of this period with old methods for unknown conditions, the adaptation of the right types of farming for such regions has come about largely through their experience and now makes farming less hazardous for the later settlers. There is still much to be learned concerning these types of farming adapted for the various parts of the big State of Montana, but with the store of experience accumulated to date Montana is now able to intelligently advise and direct the new settlement that will go hand in hand with the normal development of her great agricultural resources.

It was in the Bitter Root Valley west of the Continental Divide that the first farming of Montana soil began in about 1845. By 1864 there were also a few farms east of the Rockies, following close on the heels of the discovery of gold in Alder Gulch in 1863. In 1865 the territorial auditor in his first report covering four counties, Madison, Lewis and Clark (then Edgerton), Beaverhead and Gallatin, gave a total of 82,706 acres "claimed" with improvements valued at \$128,369. Livestock as shown comprised 4,325 oxen, 1,207 horses, 464 mules and asses, 1,896 cows and calves, and 249 swine.

It is significant that most of the farming was in close proximity to the mining camps, and many of the State's first farmers were undoubtedly first drawn to the state in search of precious metal.

The fertile Gallatin Valley had attracted a few settlers by 1870 when Gallatin County was credited with 178 farms which were producing nearly half of the wheat, and oats production of the territory at that time. Gallatin County also had three flour mills, there being three in Missoula and one in Madison County. There was one farmer at that time in Custer County which then comprised nearly the whole eastern half of the territory where now lies the bulk of the State's grain belt.

MONTANA: RESOURCES AND OPPORTUNITIES

GENERAL SUMMARY OF PRINCIPAL MONTANA CROPS
ACREAGE, PRODUCTION AND FARM VALUE—1922-1925

Crop	Year	Acres	Yield Per Acre	Produc- tion (Bu.)	Dec. 1 Price	Farm Value	Acre Value
Corn	1925	399,000	16.5	6,584,000	\$.95	\$ 6,255,000	\$15.67
	1924	420,000	18.0	7,560,000	.99	7,484,000	17.82
	1923	365,000	26.0	9,990,000	.65	6,168,000	16.90
	1922	228,000	24.3	5,540,000	.53	2,936,000	12.87
Winter Wheat.....	1925	195,000	14.5	2,828,000	1.33	3,761,000	19.28
	1924	620,000	17.1	10,602,000	1.24	13,146,000	21.20
	1923	624,000	17.0	10,608,000	.82	8,699,000	13.94
	1922	768,000	15.2	11,674,000	.89	10,390,000	13.52
Spring Wheat.....	1925	3,026,000	10.5	31,773,000	1.40	44,482,000	14.70
	1924	2,543,000	16.2	41,197,000	1.24	51,084,000	20.09
	1923	2,650,000	14.0	37,100,000	.82	30,422,000	11.48
	1922	2,850,000	14.4	41,040,000	.89	36,526,000	12.81
All Wheat.....	1925	3,221,000	10.7	34,601,000	1.37	48,243,000	14.66
	1924	3,163,000	16.4	51,799,000	1.24	64,230,000	20.33
	1923	3,274,000	14.6	47,708,000	.82	39,121,000	11.97
	1922	3,618,000	14.5	52,714,000	.89	46,916,000	12.90
Oats	1925	638,000	22.5	14,355,000	.53	7,608,000	11.92
	1924	570,000	29.5	16,815,000	.47	7,903,000	13.86
	1923	673,000	33.0	22,209,000	.38	8,439,000	12.54
	1922	660,000	32.0	21,120,000	.37	7,814,000	11.84
Barley	1925	156,000	21.0	3,276,000	.72	2,358,000	15.12
	1924	104,000	25.0	2,600,000	.69	1,794,000	17.25
	1923	105,000	25.5	2,678,000	.48	1,285,000	12.24
	1922	92,000	25.0	2,300,000	.50	1,150,000	12.50
Rye	1925	112,000	12.5	1,400,000	.74	1,036,000	9.25
	1924	80,000	14.0	1,120,000	.91	1,019,000	12.74
	1923	156,000	11.0	1,716,000	.51	875,000	5.61
	1922	240,000	14.0	3,360,000	.54	1,814,000	7.66
Flax Seed.....	1925	271,000	4.5	1,220,000	2.20	2,684,000	9.90
	1924	246,000	8.7	2,140,000	2.21	4,729,000	19.22
	1923	110,000	8.2	902,000	1.93	1,741,000	15.83
	1922	84,000	7.2	605,000	1.97	1,192,000	14.18
All Hay.....	1925	1,882,000	1.39	2,619,000	9.78	25,613,000	13.59
	1924	1,879,000	1.43	2,693,000	9.77	26,310,000	13.97
	1923	1,803,000	1.53	2,756,000	8.71	23,994,000	13.32
	1922	1,705,000	1.51	2,569,000	8.76	22,527,000	13.23
Potatoes	1925	35,000	108	3,780,000	1.60	6,048,000	172.80
	1924	34,000	88	2,992,000	.87	2,603,000	76.56
	1923	36,000	110	3,960,000	.65	2,574,000	71.50
	1922	45,000	126	5,670,000	.40	2,268,000	50.40
Beans	1925	40,000	12.5	500,000	3.05	1,525,000	38.12
	1924	34,000	12.0	408,000	3.30	1,346,000	39.60
	1923	23,000	11.5	264,000	3.70	977,000	42.55
	1922	3,800	13.0	49,000	3.20	157,000	41.60
Apples	1925	.....	.....	80,000	1.75	140,000	.....
	1924	.....	.....	290,000	1.29	374,000	.....
	1923	.....	.....	990,000	1.30	1,287,000	.....
	1922	.....	.....	610,000	1.00	610,000	.....

Prepared by Federal Division of Crop and Livestock Estimates, cooperating with the State Department of Agriculture.

From the small higher valleys in the vicinity of the mining districts agriculture spread out into the larger river valleys with the coming of the railroads. This period, 1880 to 1890, saw settlements along the Yellowstone as far east as Glendive and in the Big Horn and Powder River areas in the southeastern part of the State. At the same time some settlement was under way in parts of the Milk River Valley in the north and in the Flathead Valley in the extreme northwest.

The expansion of agriculture during the period 1870 to 1890 was much greater in the case of stock raising than with crop production. Cheap hay lands and open range on one hand and the small food needs of the sparse population on the other held crop production in a subsidiary position to cattle and sheep raising.

Such farming as was done in valley lands during this period was largely irrigated. In 1900 out of 1,736,000 acres of improved farm land more than one half was irrigated. By 1910 this percentage had dropped to less than one half and by 1920 only 15 per cent was under irrigation ditches.

On the other hand the acreage of improved lands had increased from 1,736,000 in 1900 to 11,007,000 in 1920. It was during this period that the farmer from irrigated land came in, taking up the table lands back of the main valleys and spreading out into the plains sections of eastern and northern Montana that formerly were range country.

From a distribution of a few farms in the vicinity of the mining districts in the western third of the State in 1870, Montana's farms by 1926 have spread east and north until the distribution has taken in much of the great range that was once the pasture of cattle and sheep. The great territorial area that was once divided among less than a dozen counties is now embracing 56 counties all producing a surplus above their own needs of agricultural products of crops or livestock.

With little more than one-fifth of her farm land under the plow, Montana still affords big possibilities of development of the right kind that will enable its lands to provide a safe living for the new farmers who will be seeking opportunities in the many years to come.



Twenty Miles from Great Falls.

WHEAT IN MONTANA



Tables by Years—Montana Destined to Become Greatest Wheat Growing State—Leads in Quality—Protein Tests Conducted by Montana Department of Agriculture.



The story of wheat and grain in general in Montana originates at Bozeman, in the Gallatin Valley. Here was a terminal market for all grain produced in the adjacent territory, and the home of the old Bozeman Milling Company. This company with its flour and cereal mills converted the wheat and oats, for which the Gallatin Valley is famous, into the finished product, and the Malting Company used the barley, one of the crops in which the valley excelled.

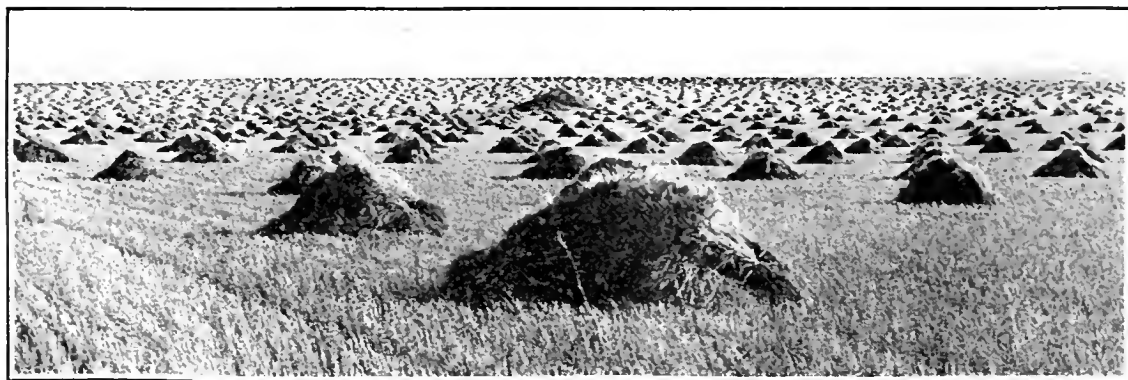
The next great development started in the Judith Basin, where incredible yields of wheat, both winter and spring, were obtained over the entire area. This vast inland empire, with Lewistown as its commercial and geographical center, has a deep soil of unusual fertility. Wheat crops of thirty, forty and fifty bushels per acre are common over the territory comprising the Basin.

Still later in our agricultural life came the development of the northeastern part of the State, comprising the Counties along the Canadian border and others served by the Great Northern Railway. In this territory the little city of Scobey, in Daniels County, claims the distinction of being the largest primary market in the United States, and probably in the world. Repeatedly over one million bushels in a single season have been handled at Scobey. Few people realize the position that Montana occupies among the wheat-growing states.

Montana's Position.

In 1910 this State stood twenty-third in the volume of wheat produced. In 1923 we occupied fifth place in nation-wide ranking and within ten million bushels of second.

Montana is destined to become the greatest wheat-growing state in the Union. Here is a table showing all wheat by years in Montana (1882-1925). Montana's steady increase in acreage and production is illustrated in the figures.



Montana Spring Wheat Field.

**ALL WHEAT BY YEARS IN MONTANA
(1882-1925)**

Year	Total Acreage All Wheat	Ave. Yield Per Acre (bushels)	Total Production (bushels)	Dec. 1 Farm Price Per Bushel	Farm Value Dec. 1
1882	42,812	16.0	685,000	\$1.45	\$ 993,250
1883	57,796	16.3	942,000	.92	866,640
1884	76,240	18.0	1,372,000	.70	960,400
1885	83,864	20.4	1,715,000	.77	1,320,550
1886	88,896	17.0	1,509,000	.75	1,131,756
1887	97,786	18.0	1,760,000	.76	1,337,600
1888	121,255	16.5	2,001,000	.85	1,700,850
1889	85,000	18.1	1,539,000	.75	1,153,875
1890	87,550	17.0	1,488,000	.80	1,190,680
1891	92,803	20.0	1,856,000	.84	1,559,090
1892	41,761	21.5	898,000	.69	619,525
1893	43,431	21.5	933,767	.60	560,260
1894	44,828	24.8	1,111,735	.54	600,337
1895	44,570	23.9	1,065,223	.73	777,613
1896	45,443	26.5	1,204,240	.66	794,798
1897	69,792	32.5	2,268,240	.68	1,542,000
1898	71,188	29.5	2,100,046	.58	1,218,027
1899	69,764	25.7	1,792,935	.61	1,093,690
1900	72,555	26.6	1,929,963	.61	1,177,277
1901	88,807	26.5	2,353,386	.67	1,576,769
1902	90,583	26.0	2,355,158	.62	1,460,198
1903	98,735	28.2	2,784,327	.66	1,837,656
1904	108,608	23.9	2,596,731	.89	2,311,091
1905	119,460	23.8	2,843,362	.71	2,018,787
1906	137,389	24.0	3,297,336	.64	2,110,295
1907	139,000	28.8	4,003,000	.81	3,243,000
1908	153,000	24.2	3,703,000	.86	3,185,000
1909	259,000	24.1	6,252,000	.87	5,639,000
1910	415,000	21.4	8,885,000	.86	7,541,000
1911	609,000	24.5	14,935,000	.77	11,500,000
1912	1,055,000	20.3	21,417,000	.64	13,707,000
1913	1,300,000	20.1	26,088,000	.66	17,218,000
1914	1,596,000	16.8	26,821,000	.91	24,407,000
1915	2,415,000	18.4	44,413,000	.78	34,642,000
1916	2,440,000	15.4	37,632,000	1.61	60,587,000
1917	2,884,000	7.3	20,934,000	1.92	40,193,000
1918	3,485,000	9.5	33,365,000	1.94	64,728,000
1919	3,621,000	2.7	9,889,000	2.35	23,239,000
1920	2,787,000	10.3	28,690,000	1.28	36,723,000
1921	2,715,000	12.3	33,430,000	.85	28,416,000
1922	3,618,000	14.5	52,714,000	.89	46,916,000
1923	3,274,000	14.6	47,708,000	.82	39,121,000
1924	3,163,000	16.4	51,799,000	1.24	64,230,000
1925	3,221,000	10.7	34,601,000	1.37	48,243,000

Prepared by U. S. Division of Crop and Livestock Estimates cooperating with the State Department of Agriculture.



In the Flathead Valley.

Wheat for Export.

Montana is a great exporter of wheat. Last year, 1925, we produced above our own total requirements a surplus of 43,206,000 bushels. In other words, we shipped outside the State wheat enough, on the basis of their respective average per capita requirements (1919-1923), to supply the states of Maine, New Hampshire, Vermont, Rhode Island, Connecticut, Delaware, Maryland, Florida, Wyoming, New Mexico, Nevada, Oregon, Arizona, and the District of Columbia with a combined population of 8,985,866. In addition to feeding these states and the District of Columbia, there would have remained 980,000 bushels, sufficient to supply the state of Nevada an additional two years. The following table, arranged by J. G. Diamond, agricultural statistician, illustrates how Montana's surplus would have been used in such a distribution:

Future Development.

These figures mean little other than to show the possibilities of the future. Last year Montana's total wheat acreage was 3,221,000. When the State has been developed to her full agricultural possibilities she will approach 10,000,000 acres in wheat and will export 120,000,000 bushels annually.

STATE	Population	1919-23 Per Capita Requirement (Bus.)	Total Requirement (Bus.)
Maine	781,220	4.3	3,359,000
New Hampshire	449,526	4.6	2,068,000
Vermont	351,244	4.9	1,721,000
Rhode Island	636,218	3.9	2,481,000
Connecticut	1,517,562	4.1	6,222,000
Delaware	233,654	4.5	1,051,000
Maryland	1,529,137	4.5	6,881,000
Florida	1,079,377	4.1	4,427,000
Wyoming	219,347	5.7	1,350,000
New Mexico	377,371	7.2	2,717,000
Nevada	77,147	5.6	432,000
Oregon	840,362	5.6	4,706,000
Arizona	401,016	6.6	2,647,000
District of Columbia.....	492,421	4.8	2,364,000
Total	8,985,862	4.71	42,326,000
Montana Surplus			43,206,000
Additional Surplus			980,000

Spring Wheat.

Spring wheat is the preference of Montana farmers. Last year (1925) our farmers produced 31,773,000 bushels of spring wheat, valued at \$44,842,000. The State's progress in acreage and production is shown by the following table:



A Sixteen-Horse One-Man Outfit.

**SPRING WHEAT BY YEARS IN MONTANA
(1890-1925)**

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Dec. 1 Farm Price Per Bushel	Dec. 1 Total Farm Value
1890	87,550	17.0	1,488,350	\$.80	\$ 1,190,680
1891	92,803	20.0	1,856,060	.84	1,559,090
1892	41,051	21.5	882,597	.69	608,992
1893	42,693	21.5	917,900	.60	550,740
1894	44,066	24.8	1,092,837	.54	590,132
1895	43,625	23.9	1,042,638	.73	761,126
1896	44,498	26.5	1,179,197	.66	778,270
1897	69,792	32.5	2,268,240	.68	1,542,403
1898	71,188	29.5	2,100,046	.58	1,218,027
1899	69,764	25.7	1,792,935	.61	1,093,690
1900	72,555	26.6	1,929,963	.61	1,177,277
1901	88,807	26.5	2,353,386	.67	1,576,769
1902	90,583	26.0	2,355,158	.62	1,460,198
1903	98,735	28.2	2,784,327	.66	1,837,656
1904	108,608	23.9	2,596,731	.89	2,311,091
1905	119,469	23.8	2,843,362	.71	2,018,787
1906	137,389	24.0	3,297,336	.64	2,110,295
1907	139,000	28.8	4,003,200	.81	3,242,592
1908	153,000	24.2	3,703,000	.86	3,185,000
1909	131,000	23.2	3,039,000	.87	2,644,000
1910	245,000	21.0	5,145,000	.86	4,425,000
1911	380,000	20.2	7,676,000	.77	5,911,000
1912	580,000	18.5	10,730,000	.64	6,867,000
1913	820,000	18.0	14,760,000	.66	9,742,000
1914	1,115,000	15.0	16,720,000	.91	15,215,000
1915	1,575,000	15.5	23,413,000	.78	18,262,000
1916	1,890,000	13.8	26,082,000	1.61	41,992,000
1917	2,279,000	6.0	13,674,000	1.92	26,254,000
1918	2,803,000	9.3	26,068,000	1.94	50,572,000
1919	3,083,000	2.3	7,091,000	2.35	16,664,000
1920	2,377,000	10.0	23,770,000	1.28	30,426,000
1921	2,290,000	12.0	27,480,000	.85	23,358,000
1922	2,850,000	14.4	41,040,000	.89	36,526,000
1923	2,650,000	14.0	37,100,000	.82	30,422,000
1924	2,543,000	16.2	41,197,000	1.24	51,084,000
1925	3,026,000	10.5	31,773,000	1.40	44,482,000

Here is a table showing winter wheat by years:

**WINTER WHEAT BY YEARS IN MONTANA
(1892-1925)**

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Bushel Dec. 1	Total Farm Value Dec. 1
1892	710	21.5	15,265	\$.69	\$ 10,533
1893	738	21.5	15,867	.60	9,520
1894	762	24.8	18,898	.54	10,205
1895	945	23.9	22,585	.73	16,487
1896	945	26.5	25,043	.66	16,528
**					
1909	128,000	25.2	3,213,000	.87	2,795,000
1910	170,000	22.0	3,740,000	.86	3,216,000
1911	229,000	31.7	7,259,000	.77	5,589,000
1912	475,000	22.5	10,687,000	.64	6,840,000
1913	480,000	23.6	11,328,000	.66	7,476,000
1914	481,000	21.0	10,101,000	.91	9,192,000
1915	840,000	25.0	21,000,000	.78	16,380,000
1916	550,000	21.0	11,550,000	1.61	18,596,000
1917	605,000	12.0	7,260,000	1.92	13,213,000
1918	682,000	10.7	7,297,000	1.94	14,156,000
1919	538,000	5.2	2,798,000	2.35	6,575,000
1920	410,000	12.0	4,920,000	1.28	6,298,000
1921	425,000	14.0	5,950,000	.85	5,058,000
1922	768,000	15.2	11,674,000	.89	10,390,000
1923	624,000	17.0	10,608,000	.82	8,699,000
1924	620,000	17.1	10,602,000	1.24	13,146,000
1925	195,000	14.5	2,828,000	1.33	3,716,000

Wheat Quality.

With all this talk of volume and quantity production, let us not lose sight of the fact that in quality Montana excells. No other state produces the quality of wheat that Montana does, as shown by the returns from the International Hay and Grain Show held in Chicago last December, 1925, where Montana exhibitors captured the world sweepstakes in Marquis wheat and a number of first prizes in winter wheat, oats, barley, and grass seeds. (Details of Montana's winnings at Chicago will be found in the chapter in this volume entitled "Products Lead World.") In percentage of spring wheat grading number one Montana leads the nation. The State's supremacy is shown in an outstanding way by the table below:

PERCENTAGE OF SPRING WHEAT IN THE SEVERAL GRADES							
State	Years	No. 1	No. 2	No. 3	No. 4	No. 5	Below No. 5
Montana	1925	68.0	19.0	9.0	2.0	1.0	1.0
	1924	84.0	10.0	5.0	1.0	.0	.0
Wyomnig	1925	20.0	47.0	24.0	3.0	6.0	.0
	1924	84.0	10.0	5.0	1.0	.0	.0
North Dakota	1925	49.0	20.0	17.0	9.0	4.0	1.0
	1924	65.0	19.0	10.0	4.0	1.0	1.0
South Dakota	1925	20.0	24.0	23.0	15.0	12.0	6.0
	1924	67.0	22.0	8.0	2.0	1.0	.0
Minnesota	1925	18.0	20.0	31.0	18.0	10.0	3.0
	1924	61.0	22.0	11.0	4.0	1.0	1.0
U. S. Average	1925	37.5	28.0	18.8	9.2	4.8	1.7
	1924	62.9	21.5	10.1	3.7	1.0	0.8



Dairy Herd.

Marketing Grain.

Wheat marketing has undergone some radical changes during the past ten years. With the advent of the United States Grain Standards Act and its enforcement, through Federal supervision, standard grades came into general use. The farmer and country buyer had barely become accustomed to trading on this basis when a new factor, that of protein, entered into the flour and baking industries, requiring another change of base for determining the value of wheat. The gluten test first made by the mills was gradually supplanted by the protein test, which is of the same relative value, and has come into general use in all of the terminal markets of this country.

The results of trading on this basis at terminal points were soon reflected back to the country buyer who must now consider two factors. He must know the Federal grade of the wheat offered as well as the milling value represented by the protein content of each grade. The range of prices paid by the mills for the same grade of wheat is at present very wide.

From the point of gluten strength Montana scores heavily, as our wheat has proven to be not only of high quality from a grade standpoint, but also because much of it contains more protein of high quality than that grown in other parts of the country.

From its investigations of milling in connection with cars of wheat arriving in Minneapolis, the United States Department of Agriculture reports that in 47 cars originating in Montana, the range of protein found was from 13.54 per cent to 15.49 per cent, commanding premiums ranging from 18c to 22c per bushel.

In South Dakota 44 cars ranging from 11.69 per cent to 12.74 per cent sold at premiums from one to six cents; from North Dakota 54 cars ranging from 11.48 per cent to 14.25 per cent protein sold at premiums ranging from one to seven cents, and six cars from Minnesota with protein from 11.91 per cent to 12.71 per cent sold at premiums of from three to five cents.

State Laboratory.

The Montana Department of Agriculture is teaching Montana farmers to take advantage of the high protein content of Montana grain. During the month of October, 1923, the Grain Division of the Montana Department of Agriculture in-



Great Falls Laboratory of State Department of Agriculture.

stalled equipment in their laboratory at Great Falls for protein tests. This branch of the department has developed until both the dealer and the farmer have been using it continually in the marketing of the crops.

W. T. Giese, chief of the Grain Division of the Montana Department of Agriculture, reports as follows: "In checking up the record of our Great Falls Inspection Office and Laboratory, I find convincing proof of the popularity and benefit of this branch of my department to the farmers and grain trade in general, in the steadily increasing number of inspections. For the year of 1922 official reports show 2,951 inspections, 1923 reports show 4,922 inspections, 1924 shows 7,739, and 1925 shows 7,870 inspections. Of this 7,870 inspections, 3,229 were protein tests. Adding to this 3,229 protein tests the 1,780 reported by the Agricultural College at Bozeman, gives us a total of 5,009 tests for protein during the year 1925.

"While this is a gratifying result and shows appreciation of our efforts to make this service popular and universal, it does not represent more than one-third of the wheat crop of the State and could not be taken as representative of the protein content of the wheat from the sections from which it was received. I will never be satisfied until the two laboratories reporting can furnish results of protein tests representing three-fourths of the wheat crop of the state. When this is done we will have an actual working knowledge of the protein content of the wheat from the different sections that will be fairly accurate and will reflect to a great extent the value of the grain in each section.

"This problem of marketing wheat on its milling value as shown by protein tests is a big one and can only be solved when the producer as well as the buyer knows the value of his wheat."

Judgment of Quality.

As the marketing of wheat is now handled, the judgment of quality is made by considering both the grade and the protein. The grade is determined by the weight and certain other physical conditions and is used as a basis for determining



Grain in Shocks.

the premium or discount. Under present conditions the quantity and quality of the protein content of the wheat is the largest factor determining the price paid at the terminal market, both east and west. Protein in wheat is that part which makes flour sticky when wet. The base of this protein is nitrogen. It is the nitrogen which is measured in the protein test. Any fertilizer, commercial or natural, which will increase the quantity of nitrogen in the soil will produce a marked increase in the volume of protein in the wheat raised on that land. This result is easily and profitably obtained by seeding down and raising two or three crops of clover, alfalfa, peas, beans or other leguminous plants, then turning the sod under and raising one or two crops of wheat. There will be noted a decided increase in the number of dark, hard vitreous kernels which, when tested, will show a corresponding increase in protein content. Where this system of crop rotation has been tried, in many cases the yield per acre has been practically doubled. This system has a great advantage over the summer fallow, in that the land, while being brought back to its normal state of fertility is raising a valuable forage crop.

For publication in this volume J. G. Diamond, agricultural statistician, has prepared the following summary of Montana development in the production of wheat:

"Wheat acreage passed the million mark in 1912 and has had a generally upward trend since. The peak of both acreage and production was reached in 1922 when a total of 3,618,000 acres were harvested with a production of 52,714,000 bushels. Due to a better yield per acre the 1924 crops almost equalled this production when 3,163,000 acres returned 51,799,000 bushels. The 1925 crop, due to a relatively poor average yield per acre, returned 31,601,000 bushels from 3,221,000 acres.

"Both winter and spring wheat are grown in Montana. In 1909 the production of winter wheat at 3,213,000 slightly exceeded that of spring wheat with 3,039,000 bushels. Spring wheat acreage, however, at that time was slightly larger than that of winter wheat and since that time has strongly increased its lead. By 1915 winter wheat reached a peak with 840,000 acres and its tendency since that time has been mostly downward. Spring wheat by 1915 had reached 1,575,000 acres and its tendency since has been sharply upwards. By 1924 spring wheat acreage was 3,163,000 acres against 620,000 for winter wheat.



Hauling Wheat to Grader.

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In 1925 spring wheat acreage further increased partly due to the heavy winter killing of the winter wheat acreage which was reduced by this loss to 195,000 acres.

"From the foregoing comparisons it is evident that spring wheat has surpassed winter wheat as the choice of Montana farmers. This is due mainly to the restricted area in which winter wheat may be safely grown from the standpoint of survival of winter compared with the statewide range of spring wheat.

"Central and south central Montana, however, are suited to winter wheat requirements and with the higher yields generally secured from winter wheat and the opportunity it offers for a better distribution of labor, this area promises to continue to be an important producer of the winter varieties.

"The most important varieties of winter wheat grown in Montana are Turkey Red, Kharkov, Kanrad and Montana 36. The hard red winter varieties grown in Montana are of excellent milling qualities.

"Spring wheat is grown extensively in all sections of the State, but the extreme northeastern Counties constitute the heaviest producing area. A small percentage of Durum, or macaroni, wheat is grown in the eastern half of the State and is included in spring wheat production figures.

"Most of the spring wheat is grown on non-irrigated land. The principal variety is Marquis, a hard milling wheat that attains a high quality under Montana growing conditions. In fact, Montana leads all other states in the Union in the percentage of her spring wheat crop grading number one. Only once has this leadership been tied, and that was in 1924, when Wyoming, a less important producer, graded 84 per cent number one. Drought and hot winds are the principal risks in spring wheat yields. Since 1890 there have only been three successive years in which yields were seriously affected by these factors and that period was from 1917 to 1919 inclusive when occurred what is generally conceded to have been the longest dry period of its kind in more than 40 years of available weather records.

"Comparatively little damage is experienced in Montana from diseases affecting the wheat plant. Black rust, a serious damage factor in some sections farther east, has occasionally appeared in the eastern border Counties, but its damage upon the entire crop has been very small. Smut is controlled by treating the seed, but cut worms and grasshoppers have at times been serious damage factors in some localities.

"Wheat will undoubtedly continue to be the most important crop in Montana for many years to come, judging from its present lead over all other crops. There is an element of risk in wheat raising in all climates, and Montana farmers, to a large extent, have already followed the practice of the older wheat-growing sections of the country in diversifying to some extent their wheat farming with other crops and farm livestock."



Wheat Field in Pondera County.

CORN IN MONTANA

By J. G. Diamond.

Corn acreage has made a remarkable expansion in Montana during the past ten years, increasing from about 50,000 acres in 1914 to 420,000 acres in 1924, when there was a slight setback, to about 400,000 bushels in 1925. The importance of the development of the corn crop in Montana does not lie in its contribution as a cash grain crop, the percentage used in this way being very small, but in the fact that in corn the Montana farmer has found a valuable feed crop for his farm animals as well as an alternative crop for his small grain acreage, which improves soil and helps control weeds, which inevitably follow an intensive small grain farming.

Tying up with the increase in corn acreage are such important changes as big gains in farm breeding of hogs, and a general increase in the number of milk cows on farms. In the increase, therefore, of corn acreage is to be seen the drift of Montana farming from the older type of grain farming, often called the single crop system, to a more diversified type permitting the smaller sized farms.

While this drift may have limits which will ultimately check the rapid rate increase in corn acreage, most observers predict for corn an important place in Montana agriculture tying up with a further large expansion in dairy production and hogs.

Several varieties of Dent and Flint corn adapted to Montana conditions have already proven very satisfactory yielders, under average conditions, and there is reason to believe that plant breeders will continue to improve types to better fit Montana climate. Silage yields of corn have frequently attained high averages in Montana, and this utilization is developing with the increasing needs of the growing dairy industry.

Corn, by reason of its drouth and hot weather resistance, offers an excellent offset to the average risk of these factors in wheat productions. Corn land, also, provides an excellent tillage on which spring grains may be disced in, at a saving of time and labor during the busy spring season.

Some of the advantages offered corn under Montana conditions may be summarized as follows:

- (1) Permits greater and more profitable diversification of livestock.
- (2) Corn is thrifty user of water and resists drouth.



Corn in Roosevelt County, 1925.

(3) Good substitute for summer fallow in making seed bed for small grain crops, with one advantage over summer fallow in that there is no total loss of labor in cultivation, and land is kept in use.

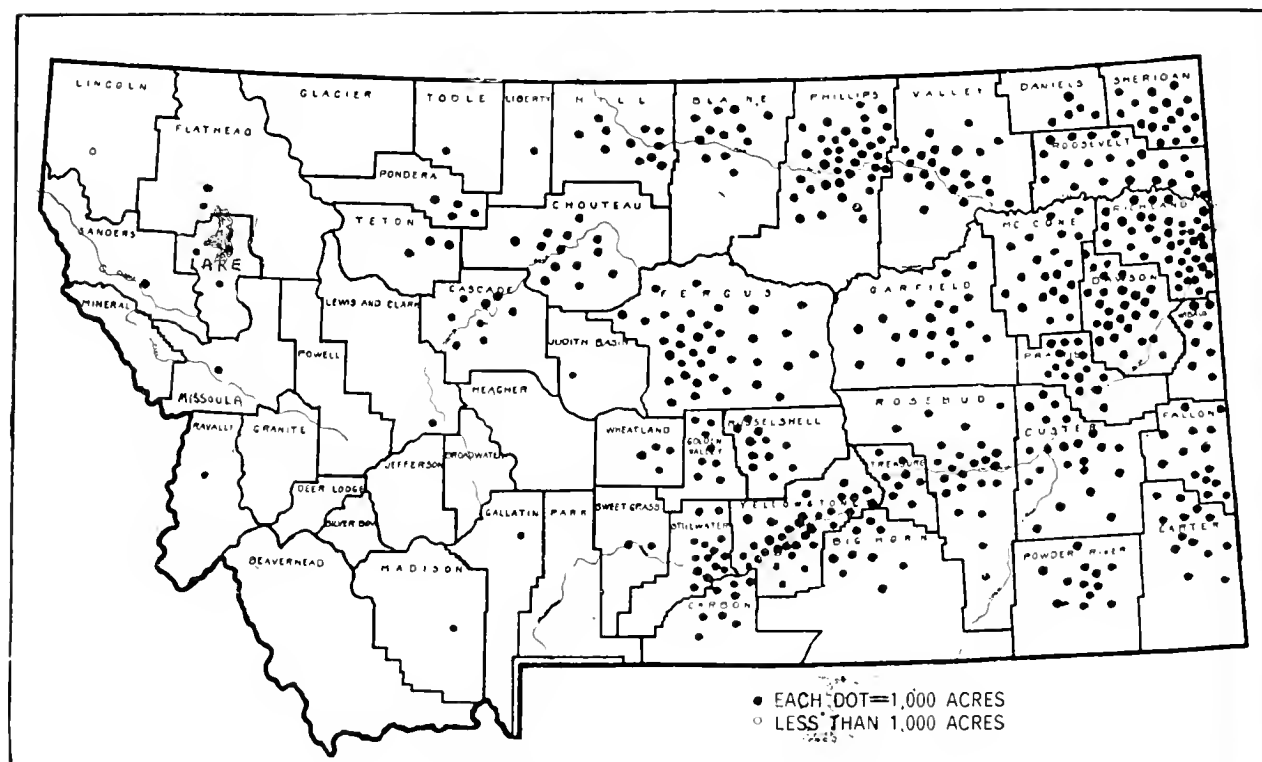
(4) Corn provides a cheap and fairly sure supply of roughage for feed.

(5) Corn from a large crop can be stored or siloed against the needs of a year when the crop is short.

That corn is not a stranger, nor a newcomer, among the crops of the Northwestern farm is evidenced from the fact that the Indians long before the coming of the white man were raising corn in Missouri River bottoms of North Dakota. The corn plant, itself a native originally of the warm regions far south of its present northern limits, was evidently brought north by the Indians, and much of the work of the white man in plant breeding in late years has been shortened by the earlier work of the Indian in gradually adapting the corn plant to the shorter growing seasons and cooler nights of northern states.

The history of corn in Montana dates back practically to the beginning of wheat production. In 1882 little less than 500 acres of corn were estimated as the total in the State, and by 1892 only about a thousand acres were recorded. Comparatively little development was made prior to 1910, but between 1910 and 1915 a rapid upward trend became noticeable. The rate of increase subsequent to 1915 has been very pronounced, and if maintained would place the crop at the end of the next decade in almost as important a position as wheat.

The reason for the early slow development of corn acreage contrasted with the great expansion of late years lies in the type of farming of the early and middle periods of Montana farm history. During this period the extensive cattle raising of the range days was slowly giving ground to the grain farmer, who in the richness of Montana soil found large profits in producing wheat together with the prospect of enhanced land values. There was little inducement to practice the farm programs which the new settlers left in the older agricultural regions where a large investment in the land required a more diversified crop rota-



Distribution of Corn.

tion, farm livestock and much more labor. Wheat or cattle ranching on large units of cheap lands with low production cost, and cash markets for each year's out-turn, held out such rewards, barring climatic hazards, that the new settler readily adopted the one-crop idea which in favorable years gave large returns for a few months' work.

Corn had but little place in such a cropping system and naturally did not begin to fill its real place on the Montana farm until the type of farming began to change over on to a more permanent kind. This period may be said to have begun with the big settlement movement that started about 1900, although it was well along toward the end of the second decade before corn began to find its real stride.

Utilization of Montana's Corn Acreage.

In 1925, out of a total corn acreage of 399,000 acres, 72,000 acres were estimated to have been harvested as matured grain corn; 2,000 acres to have been cut for silage and, 319,000 acres to have been hogged down, grazed or otherwise utilized as forage. This distribution shows a somewhat lower percentage of corn used as grain than usual, due to the character of the season for maturing the crop, although

CORN BY YEARS FOR MONTANA (1882-1925)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Bushel Dec. 1	Total Farm Value Dec. 1
1882	492	36.6	18,000	\$1.05	\$ 18,900
1883	502	20.0	10,040	.90	9,036
1884	830	24.9	20,700	.75	15,525
1885	880	25.0	22,000	.80	17,600
1886	890	24.7	22,000	.65	14,300
1887	908	27.5	25,000	.60	15,000
1888	.....	.....	.....	.....	.....
1889	.....	.....	.....	.....	.....
1890	.....	.....	.....	.....	.....
1891	.....	.....	.....	.....	.....
1892	1,080	19.4	21,000	.68	14,364
1893	1,102	27.5	30,305	.70	21,214
1894	1,157	32.7	37,834	.82	31,024
1895	1,331	25.0	33,275	.75	24,956
1896	1,331	26.0	34,606	.60	20,764
1897	1,065	18.0	19,170	.65	12,460
1898	1,598	28.0	44,744	.66	29,531
1899	1,582	23.0	36,386	.52	18,921
1900	1,598	15.0	23,970	.59	14,142
1901	3,095	25.0	77,375	.90	69,638
1902	3,714	22.0	81,708	.72	58,830
1903	3,788	24.1	91,291	.62	56,600
1904	3,902	22.2	86,624	.68	58,904
1905	3,941	19.4	76,455	.68	51,989
1906	3,980	23.4	93,132	.65	60,536
1907	4,000	22.5	90,000	.68	61,000
1908	4,000	23.4	94,000	.90	85,000
1909	10,000	28.8	274,000	.86	236,000
1910	16,000	23.0	368,000	.95	350,000
1911	20,000	26.5	530,000	.80	424,000
1912	24,000	25.5	612,000	.70	428,000
1913	28,000	31.5	882,000	.77	679,000
1914	50,000	28.0	1,400,000	.76	1,064,000
1915	70,000	28.0	1,960,000	.69	1,352,000
1916	74,000	25.0	1,850,000	.93	1,720,000
1917	81,000	12.5	1,012,000	1.75	1,771,000
1918	100,000	21.0	2,100,000	1.35	2,835,000
1919	133,000	4.0	532,000	1.65	879,000
1920	184,000	12.1	2,226,000	.80	1,789,000
1921	190,000	20.1	3,800,000	.67	2,546,000
1922	228,000	24.3	5,540,000	.53	2,936,000
1923	365,000	26.0	9,490,000	.65	6,168,000
1924	420,000	18.0	7,560,000	.99	7,484,000
1925	399,000	16.5	6,584,000	.95	6,255,000

Compiled by U. S. Division of Crop and Livestock Estimates cooperating with State Department of Agriculture.

the percentage used for forage purposes, as a rule, accounts for more than two-thirds of the crop. Montana farmers will probably continue to utilize corn largely as a farm feed rather than attempt to ship any large percentage to market.

Corn has been successfully grown in all sections of Montana, except the high altitudes where August frosts prevail. Practically the whole eastern third of the State to the Canadian border shows a fairly dense distribution of the crop with extensions westward through the Milk River, Yellowstone and Gallatin Valleys. Corn is also grown extensively in central and north central Montana, with some scattered acreage in northwestern Montana, west of the Continental Divide.

The future of corn acreage in the State is very encouraging and there is little doubt but that the present upward trend will continue for some time, although possibly at a somewhat slower rate than the big expansion of recent years. The corn crop of Montana is evidence of the possibilities of the State for general farming, including livestock and dairy production.

RYE.

Both winter and spring sown rye are grown in Montana, the fall sown rye making up the bulk of the total. Estimates of rye acreage exclude that cut for hay. The practice of cutting rye for hay is general in some of the drier sections of the State where grass growth is short. As a grain, rye is utilized both as a feed crop and as a marketable cash crop, and in the latter usage acreage is influenced to some extent by trends of market prices. A relatively large acreage was harvested in 1922, when with lower market prices the 1923 acreage was curtailed. In 1924 relatively high prices were paid for rye, which was partly responsible for the increase shown for the 1925 crop. The northern counties lead in production of rye grain, although considerable acreage is grown in central Montana for both grain and hay, and there is a relatively good distribution of acreage over most of the State.

The hardiness of rye and its adaptability to dry land sections make it a very suitable crop for Montana farms.

RYE BY YEARS FOR MONTANA
(1901-1925)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Bushel Dec. 1	Total Farm Value Dec. 1
1901	1,834	26.7	48,968	\$.60	\$ 29,381
1902	1,871	25.0	46,775	.64	29,936
1903	1,890	24.6	46,494	.63	29,291
1904	1,871	19.9	37,233	.77	28,669
1905	1,871	20.0	37,420	.65	24,323
1906	2,021	20.5	41,430	.66	27,344
1907	2,100	22.0	47,000	.68	32,000
1908	2,000	20.0	40,000	.68	27,000
1909	6,000	18.4	111,000	.75	83,000
1910	6,000	20.0	120,000	.68	82,000
1911	8,000	23.0	184,000	.72	132,000
1912	10,000	23.5	235,000	.60	141,000
1913	13,000	19.0	247,000	.55	136,000
1914	16,000	20.0	320,000	.70	224,000
1915	21,000	22.5	472,000	.65	307,000
1916	30,000	20.5	615,000	.96	590,000
1917	29,000	12.7	368,000	1.65	607,000
1918	54,000	12.0	648,000	1.44	633,000
1919	76,000	3.0	228,000	1.85	422,000
1920	59,000	8.0	472,000	1.08	510,000
1921	116,000	11.2	1,299,000	.53	688,000
1922	240,000	14.0	3,360,000	.54	1,814,000
1923	156,000	11.0	1,716,000	.51	875,000
1924	80,000	14.0	1,120,000	.91	1,019,000
1925	112,000	12.5	1,400,000	.74	1,036,000

Table prepared by U. S. Division Crop and Livestock Estimates cooperating with State Department of Agriculture.

HAY

Total production of hay in 1925 was but slightly below that of 1924. Although average yield was but 1.39 tons per acre compared with 1.43 tons in 1924 and 1.53 tons in 1923, acreage cut was larger and total production was 2,619,000 tons against 2,693,000 tons in 1924 and 2,756,000 tons in 1923. The large bulk of the state's hay crop is tame hays made up largely of alfalfa and grain cut green for hay, some clovers, timothy, millets and miscellaneous make up the remainder. Wild hay acreage which is about a third of the total is largely blue-joint and has a high nutritive value.

Yields of all tame hays averaged high for the first cuttings, but throughout the eastern half of the state generally later cuttings showed effects of the dry weather. Since 1919 when an unusually short crop and severe winter produced a great shortage of hay, production has been increased and considerable old crop is carried over from season to season as reserve. Wild hay yields were above average in the important producing southwestern counties, but generally below average elsewhere.

BARLEY.

While having a wide range of adaptability as well as an extensive distribution, barley acreage in Montana has never averaged much more than a fifth of the acreage devoted to oats. Like its companion crop, oats, it is grown largely as a farm feed, although in certain sections of the non-irrigated districts barley of good quality can be grown, especially in years when moisture conditions are favorable for the production of a good, plump berry. The dry weather gives good conditions under which to harvest the crop retaining both quality and color.

Barley has the advantage of requiring on an average a somewhat shorter growing season than either oats or wheat and is exposed, therefore, for a shorter time to the unfavorable climatic conditions that occasionally reduce the yields of the other grains.

This was illustrated in 1925 when from about the 10th to the 17th of July a period of hot winds reduced yields of wheat and oats materially throughout the eastern half of the State, while barley came through with but four bushels below the high average of 1924.

In weight per measured bushel Montana barley also ranks high, the 10-year average being 48.6 pounds for Montana compared with 46.1 pounds for the United States.

The 1924 barley prices stimulated interest in the crop as an alternative cash crop, and 1925 acreage was increased sharply to about 156,000 against 104,000 in 1924, and 92,000 in 1922. Whether the crop will hold this level in the next few years depends upon the market price as well as the competition of corn, with which barley acreage was alternative choice in the decrease in corn acreage in some sections last spring.

BARLEY BY YEARS FOR MONTANA
(1882-1925)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Bushel	Total Farm Value Dec. 1
1882	1,852	29.1	53,959	\$1.00	\$ 53,959
1883	1,945	25.8	50,182	.73	36,663
1884	2,139	34.6	74,000	.60	44,400
1885	2,353	30.2	71,000	.77	54,354
1886	3,144	22.9	72,000	.46	33,120
1887	3,458	22.6	78,000	.56	43,680
1888	3,804	28.7	109,000	.65	70,964
1889	4,652	34.6	160,000	.60	96,541
1890	4,792	24.0	115,008	.74	85,106
1891	4,792	30.0	143,760	.65	93,444
1892	5,032	32.5	163,540	.66	107,936
1893	5,183	30.1	156,008	.50	78,004
1894	5,183	22.5	116,618	.40	46,647
1895	5,701	25.0	142,525	.59	84,090
1896	5,701	25.0	142,525	.55	78,389
1897	5,188	38.0	197,144	.50	98,572
1898	5,240	36.0	188,640	.57	107,525
1899	6,183	35.0	216,405	.51	110,367
1900	5,194	38.8	201,527	.48	96,733
1901	16,398	39.0	639,522	.57	364,528
1902	17,874	37.0	661,338	.51	337,282
1903	18,231	40.2	732,886	.58	425,074
1904	17,502	29.9	523,310	.62	324,452
1905	15,227	33.0	502,491	.56	281,395
1906	14,313	33.0	472,329	.56	264,504
1907	17,000	38.0	646,000	.62	400,000
1908	25,000	35.0	875,000	.61	534,000
1909	27,000	27.7	753,000	.63	474,000
1910	30,000	28.0	840,000	.62	521,000
1911	31,000	34.5	1,070,000	.68	728,000
1912	39,000	36.5	1,424,000	.53	755,000
1913	60,000	31.0	1,860,000	.48	893,000
1914	70,000	30.5	2,135,000	.53	1,132,000
1915	80,000	34.0	2,720,000	.48	1,306,000
1916	95,000	28.0	2,660,000	.76	2,022,000
1917	90,000	15.0	1,350,000	1.03	1,390,000
1918	87,000	22.0	1,914,000	1.00	1,914,000
1919	75,000	5.6	420,000	1.40	588,000
1920	64,000	18.0	1,152,000	.65	749,000
1921	75,000	20.5	1,538,000	.60	923,000
1922	92,000	25.0	2,300,000	.50	1,150,000
1923	105,000	25.5	2,678,000	.48	1,285,000
1924	104,000	25.0	2,600,000	.69	1,794,000
1925	156,000	21.0	3,276,000	.72	2,359,000

Table prepared by U. S. Division of Crop and Livestock Estimates cooperating with the State Department of Agriculture.

OATS.

Oats primarily is grown as a farm feed in Montana, although a varying percentage usually less than 20 per cent is sold, depending largely upon market prices. Acreage of oats ranks about third among Montana crops, being exceeded by wheat and hay. Considering its total value, including that of farm feed, it also ranks about third in annual crop values.

In acreage the crop has shown a fairly steady increase up until 1919, after which acreage has averaged something over 650,000 acres.

The crop has about the same range of distribution as spring wheat, if anything slightly exceeding that crop in adaptability to varying Montana conditions. It is in the irrigated acreages of the northeast, east, and central parts of the State that the densest oats acreage occurs.

The leading varieties grown in the States are Swedish Select, Victory, and Sixty Day, all of which yield well, and in some seasons under irrigation very high acre yields are secured. Montana oats test usually well above the standard bushel

weight and in this respect are above the average of the entire United States, with no other state equalling Montana except Wyoming. Over a period of ten years Montana oats have an average weight per bushel of 36.5 pounds compared with the average of all United States of 32.0 pounds, the standard weight per bushel.

OATS BY YEARS IN MONTANA
(1882-1925)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Tton Dec. 1	Total Farm Value Dec. 1
1882	28,000	39.3	1,100,000	\$.75	\$ 825,000
1883	32,200	37.6	1,210,000	.58	701,800
1884	52,000	33.5	1,740,000	.35	609,000
1885	53,560	33.1	1,775,000	.42	745,500
1886	56,774	35.0	1,987,000	.55	1,092,850
1887	60,180	31.0	1,866,000	.45	839,700
1888	61,384	29.0	1,780,000	.34	605,200
1889	85,938	30.0	2,578,000	.44	1,134,382
1890	90,235	31.0	2,797,000	.59	1,650,398
1891	94,747	32.0	3,048,000	.48	1,750,925
1892	66,323	28.8	1,910,000	.40	764,041
1893	66,986	34.0	2,277,524	.37	842,684
1894	66,986	40.1	2,686,139	.31	832,703
1895	68,326	35.8	2,446,071	.44	1,076,271
1896	64,910	40.7	3,050,770	.31	945,739
1897	61,664	42.0	2,589,888	.33	854,663
1898	61,047	40.6	2,478,508	.35	867,478
1899	60,986	38.0	2,317,468	.39	903,813
1900	65,865	39.0	2,568,735	.42	1,078,869
1901	147,365	42.0	6,189,330	.36	2,228,159
1902	159,154	41.9	6,668,553	.36	2,400,679
1903	162,337	46.4	7,532,437	.35	2,636,353
1904	167,207	37.7	6,303,704	.46	2,899,704
1905	178,911	41.3	7,389,024	.43	3,177,280
1906	196,802	43.2	8,501,846	.44	3,740,812
1907	240,000	49.0	11,760,000	.46	5,410,000
1908	254,000	41.6	10,566,000	.49	5,177,000
1909	333,000	41.4	13,806,000	.42	5,798,000
1910	390,000	38.0	14,820,000	.46	6,817,000
1911	425,000	49.8	21,165,000	.40	8,466,000
1912	476,000	48.0	22,848,000	.35	7,997,000
1913	500,000	43.5	21,750,000	.32	6,960,000
1914	530,000	35.0	18,550,000	.39	7,234,000
1915	600,000	52.0	31,200,000	.32	9,894,000
1916	660,000	38.0	25,080,000	.47	11,788,000
1917	680,000	20.0	13,600,000	.81	11,016,000
1918	680,000	30.0	20,400,000	.80	16,320,000
1919	579,000	6.0	3,474,000	.91	3,161,000
1920	533,000	22.0	11,726,000	.51	5,980,000
1921	618,000	24.0	14,832,000	.34	5,043,000
1922	660,000	32.0	21,120,000	.37	7,814,000
1923	673,000	33.0	22,209,000	.38	8,439,000
1924	570,000	29.5	16,815,000	.47	7,903,000
1925	638,000	22.5	14,355,000	.53	7,608,000

Table prepared by U. S. Division Crop and Livestock Estimates cooperating with the State Department of Agriculture.

FLAX.

Flax acreage reached its peak during the expansion period when it was used as a sod crop by settlers and homesteaders opening up the virgin lands. The largest acreage was that of 1917, when 583,000 acres were harvested. Subsequently the crop went through a period of decreases, falling as low as 84,000 acres in 1922. With the improvement in price in recent years, flax has come back to a position of relative importance. In 1925 the acreage harvested was 271,000, with a production of 1,220,000 bushels, valued at \$2,684,000.

Although originally grown only on the plowed sod of new land, due to the risk of flax-wilt on old lands, flax, through the development of wilt-resistant

strains and in long rotation systems, is now grown extensively on old lands, thus finding a permanent place among the State's crops.

The average farm price of flaxseed has ranged from \$1.93 per bushel in 1923 to \$2.21 in 1924, and with favorable yields the crop has returned good cash incomes in recent years. Practically all of the production, except that saved for seed, is shipped to markets outside the State.

FLAX BY YEARS FOR MONTANA
(1902-1925)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Bushel Dec. 1	Total Farm Value Dec. 1
1902	12,500	9.6	112,500	\$.68	\$ 76,500
1903	12,625	14.0	176,750	.60	106,050
1904	9,334	8.0	74,672	.95	70,938
1905	16,570	10.0	165,700	.82	135,874
1906	24,855	12.0	298,260	1.00	298,260
1907	34,000	13.0	436,000	.81	353,000
1908	9,000	11.5	104,000	1.00	104,000
1909	38,000	11.9	447,000	1.60	715,000
1910	300,000	7.0	2,100,000	2.40	5,040,000
1911	425,000	7.7	3,272,000	1.80	5,890,000
1912	460,000	12.0	5,520,000	1.12	6,182,000
1913	400,000	9.0	3,600,000	1.15	4,140,000
1914	300,000	8.0	2,400,000	1.20	2,880,000
1915	250,000	10.5	2,625,000	1.70	4,462,000
1916	325,000	9.5	3,088,000	2.48	7,658,000
1917	583,000	3.0	1,749,000	2.95	5,160,000
1918	547,000	3.0	1,641,000	3.38	5,547,000
1919	370,000	1.3	481,000	4.40	2,116,000
1920	407,000	2.6	1,058,000	1.75	1,851,000
1921	110,000	5.0	550,000	1.40	770,000
1922	84,000	7.2	605,000	1.97	1,192,000
1923	110,000	8.2	902,000	1.93	1,741,000
1924	246,000	8.7	2,140,000	2.21	4,729,000
1925	271,000	4.5	1,220,000	2.20	2,684,000

Compiled by Division of Crop and Livestock Estimates Cooperating with the Montana Department of Agriculture.



An Irrigated Potato Field.

SEED POTATOES.

By Edward Dickey.

Montana, as a state, has made rapid advances the past few years in convincing the large consuming markets that both commercial and seed potatoes of high quality are produced within her borders. By properly grading her crop and placing it on the markets which demand good quality potatoes, the Netted Gems grown in Montana will soon be recognized as being the product the consuming public will demand.

The Netted Gem is grown more extensively than any other potato and is fast being adopted by the growers in all sections of the State where soil and climatic conditions are ideal for growing this variety. The potato producing sections in the State lying west of the mountains have practically eliminated the red and white varieties, and it is only a question of a short time when those districts will grow Netted Gems exclusively. The Helena and Bozeman districts, including the Madison and the Beaverhead Valleys, are fast becoming Gem producing sections, as the growers realize it is to their advantage to grow a product that the markets demand. The irrigated districts of Washington and Idaho, which are heavy producers of Netted Gems, recognize the fact that Montana produces seed Gems which yield heavy crops of shapely potatoes, and on account of their freedom from disease, desire Montana seed. The Kalispell district will ship approximately 100 cars of Gem seed to the Yakima section this season, the most of which has been grown without irrigation. The Helena district has been shipping to the districts in southern Idaho and will ship most of her seed stock to that section this year.

The Milk River section in northern Montana grows the Bliss Triumph more extensively than any other variety and is making rapid strides in establishing themselves in the seed markets of the southern states. As a rule, the Triumphs grown in that district are practically free from scab, and for that reason the



Montana Jerseys.

Milk River Valley will run strongly to Triumphs for the southern seed markets. Some excellent Irish Cobbler seed stock is also grown in that section, but the Triumph will be the leading variety.

The sections around Sidney, Wibaux and Baker, in the extreme eastern portion of the State, can grow the Bliss Triumph very successfully and with the southern field as a market for their seed stock should find potato growing a very profitable industry in that portion of the State.

POTATOES BY YEARS FOR MONTANA
(1882-1925)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Bushel Dec. 1	Total Farm Value Dec. 1
1882	2,500	120	300,000	\$1.00	\$ 300,000
1883	2,575	105	270,375	.70	189,263
1884	2,781	105	292,000	.56	162,520
1885	3,198	82	262,000	.50	131,118
1886	4,253	106	451,000	.90	405,900
1887	4,466	110	491,000	.64	314,240
1888	4,600	120	552,000	.50	276,000
1889	4,270	87	371,490	.65	241,468
1890	4,484	73	327,332	.80	261,866
1891	4,708	120	564,960	.41	231,634
1892	4,614	100	461,400	.60	276,840
1893	4,799	138	662,262	.69	456,961
1894	5,183	111	575,313	.48	276,150
1895	5,442	53	288,426	.48	138,444
1896	4,952	170	841,840	.32	269,389
1897	4,506	156	702,936	.40	281,174
1898	4,551	104	473,304	.55	260,317
1899	4,597	141	648,177	.53	342,534
1900	4,781	134	640,654	.53	339,547
1901	9,932	157	1,559,324	.73	1,138,307
1902	11,521	153	1,762,713	.50	881,356
1903	12,904	176	2,271,104	.44	999,286
1904	13,162	143	1,882,166	.61	1,148,121
1905	13,688	120	1,642,560	.59	969,110
1906	14,099	152	2,143,048	.61	1,307,259
1907	18,000	150	2,700,000	.50	1,350,000
1908	20,000	138	2,760,000	.70	1,932,000
1909	21,000	156	3,276,000	.51	1,671,000
1910	22,000	120	2,640,000	.85	2,244,000
1911	25,000	150	3,750,000	.74	2,775,000
1912	30,000	165	4,950,000	.40	1,980,000
1913	33,000	140	4,620,000	.67	3,095,000
1914	33,000	140	4,620,000	.64	2,957,000
1915	36,000	155	5,580,000	.50	2,790,000
1916	37,000	125	4,625,000	1.20	5,550,000
1917	39,000	95	3,705,000	1.02	3,779,000
1918	37,000	135	4,995,000	.80	3,996,000
1919	38,000	60	2,280,000	1.60	3,648,000
1920	40,000	110	4,400,000	1.05	4,620,000
1921	41,000	115	4,715,000	.80	3,772,000
1922	45,000	126	5,670,000	.40	2,268,000
1923	36,000	110	3,960,000	.65	2,574,000
1924	34,000	88	2,992,000	.87	2,603,000
1925	35,000	108	3,780,000	1.60	6,048,000

Compiled by U. S. Division of Crop and Livestock Estimates cooperating with the State Department of Agriculture.

BEEKEEPING PAYS IN MONTANA.

By O. A. Sipple.

While to the outside public very little is known about beekeeping in Montana, this industry is rapidly assuming importance.

The reason for Montana's rapid strides in this business is that she is fortunate in possessing such natural conditions that since bees were first kept in the State there has never been a crop failure. The altitude, with long, bright days and cool nights, together with a moderate amount of moisture, are the best possible conditions for heavy nectar secretion.

That Montana is rapidly taking its place among the leading honey states may be seen by a comparison of the following figures. The 1909 census showed that at that time Montana had 6,313 colonies of bees, with the combined value of honey and wax produced at \$21,935. Ten years later, in 1919, the census showed that there were 11,918 colonies of bees, with the value of honey placed at \$160,270.00. In 1925 the crop increased considerably. It is estimated that approximately 2,500,000 pounds of honey have been produced, the wholesale value being in the neighborhood of \$250,000.00.

The average yield per colony over a period of years in Montana is between 200 and 300 pounds.

The honey industry is confined largely to the irrigated sections. There are approximately two million acres of irrigated land in Montana, thus giving one an idea of the immense territory open to beekeeping. Wherever irrigation is carried on are usually found great quantities of sweet clover, alfalfa, and Alsike clover, all of which are honey producing plants. It is from these plants that the bees gather the major portion of their surplus honey. As yet there are many good locations available for beekeeping; however, each year new territory is being taken up and it will be only a matter of a few years until Montana's best beekeeping territory will be occupied.

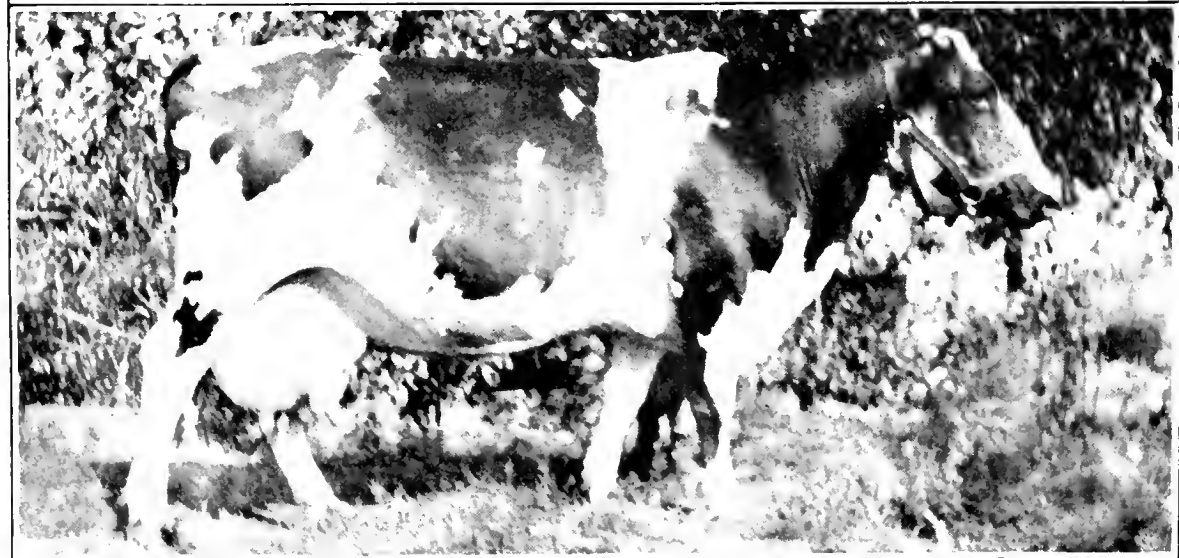
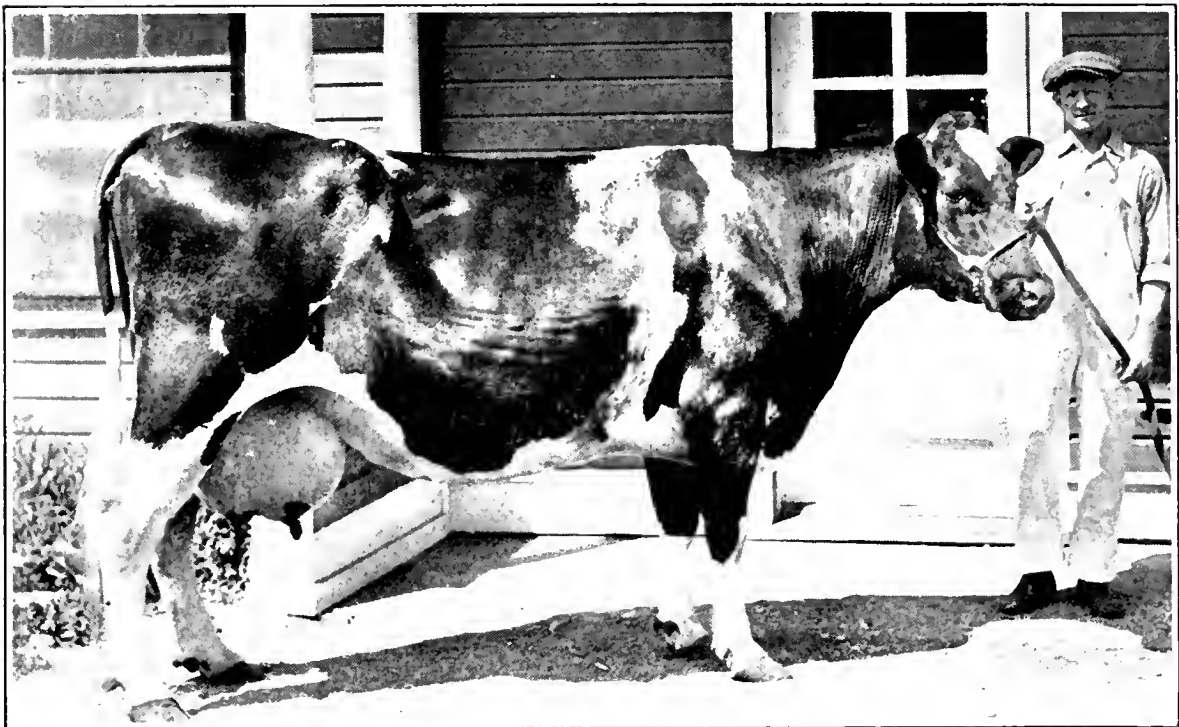
In order that the beekeeping industry may be properly protected, the Montana State Beekeepers' Association has had several laws passed. Beekeepers wishing to move to Montana cannot do so unless all bees are accompanied by a health certificate stating that they are free from disease. Since it has been impossible to obtain any amount of financial assistance from the State Legislature, the beekeepers have had a law passed requiring the registration of all beekeepers. The money received from these registration fees is used for disease control purposes.

Communications regarding beekeeping in Montana should be addressed to the State Department of Agriculture, Helena, Montana.

BEEES AND HONEY

(Bees on farms, honey and wax produced, with value (from U. S. Census Bureau))

YEAR	BEEES		HONEY		WAX	
	No. of Farms	No. of Hives	Pounds Produced	Value \$	Pounds Produced	Value \$
1909	795	6,313	135,510	21,802	394	133
1919	1,199	11,918	630,608	157,656	7,682	2,614



DAIRYING IN MONTANA



Production of Dairy Products Doubled in Past Five Years—Dairy Organizations Being Formed Rapidly—Montana Butter Given Preference in Coast Markets.



By G. A. Norris.

Earliest references to dairy cattle in Montana date back to 1829 and the first part of the following decade, during the time of construction of Fort Union and Fort McKenzie. Some reference is made to cattle and dairy cows by Prince Maximilian in his description of these early forts. "In the inner quadrangle are the residences of the clerks, interpreters, etc. . . .; stables for the horses and cattle, etc. . . . The Fort contains about fifty or sixty horses, some mules and an inconsiderable number of cattle. The cattle are very fine and the cows yield an abundance of milk." Reference is also found where "Fort McKenzie boasts of one of the most splendid Durham bulls that can be found in the United States or Territories."

"The Long Drive."

Discovery of the quality of Montana grass was made through the conditioning of southern horses which were brought into Montana late in the fall and came through the winter in a condition which surprised the pioneers. Partly due to this discovery and also the drouth on southern ranges, cattle were gradually pushed north and eventually large herds were brought in, thus originating the cattle traffic over the route in after years referred to as the "Long Drive." The first

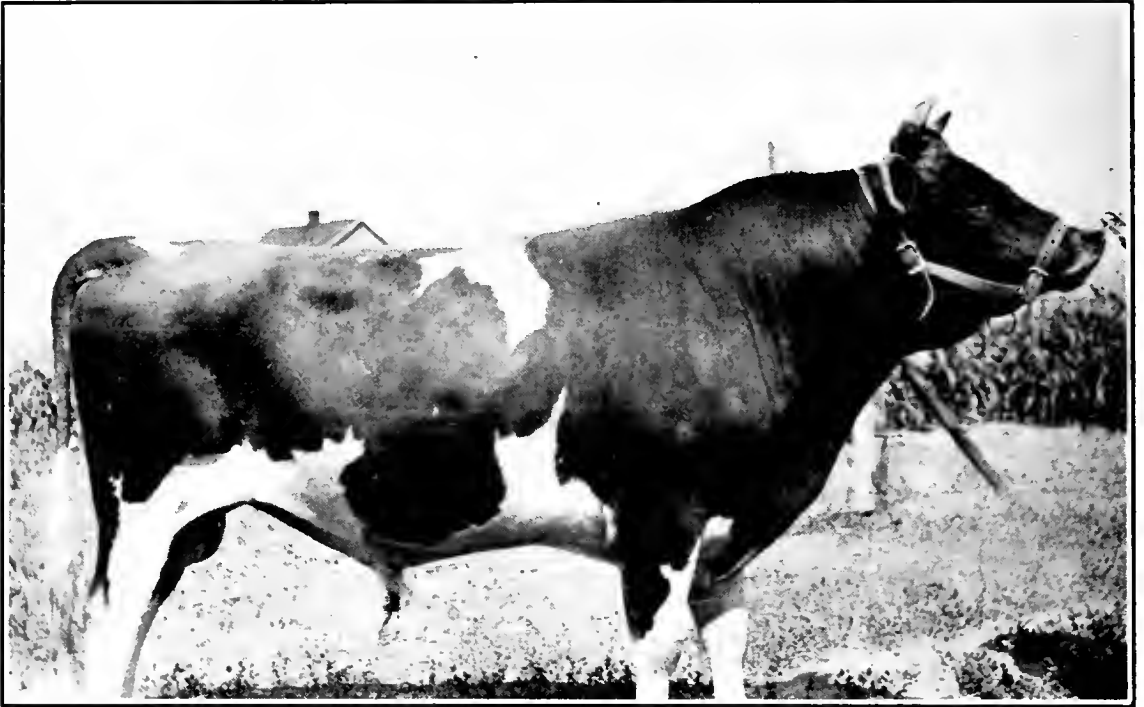
"THREE GRAND MATRONS."

Shown on opposite page. Records and owners follow:

Top—Grace Koningen, owned by Montana State College. World champion dairy cow at 10 years. Produced 32,294.4 pounds of milk, 1,015.9 pounds of butter fat and 1,314.8 pounds of butter. Deceased.

Center—Mutual Clothilde DeKol 3d. Twice 1,000 pounds butter producer and former Montana State Champion with 1,182 pounds of butter and 30,000 pounds of milk. Owned by Hofstetter Holstein Farm, Lewistown.

Bottom—Johanna Aggie Homestead, owned by O. K. Iverson, Kalispell. Produced 31,911.4 pounds of milk and 1,034 pounds of butter.



Son of "Montana," Only Gold Medal Cow, Owned by Fred M. Griffith, Lewistown.

herds of any appreciable size were driven to that section of Montana known as the Blackfeet Reservation. Recognition of the superior food value of Montana alfalfa is generally conceded by those actively engaged in the industry. In comparison with other dairy states Montana more than holds her own. In one cow testing association, records of from three hundred and fifty to as high as five hundred and one pounds of butterfat were produced on a ration of alfalfa and pasture without grain, and the average production was two hundred and seventy-five pounds of fat.

Cow Testing Associations.

The largest increase in cow testing associations over any period in the history of the industry has taken place. Weeding out the unprofitable cows from many of the dairy herds connected with cow testing associations has resulted in smaller herds of better quality and of increased production. In one cow testing association the elimination of the "boarder" cows resulted in a saving of \$91.00 per cow for each cow in the association. The dairymen are rapidly becoming aware of the value of being members of such organizations and the future may find every dairyman worthy of the name in union with some organization which keeps an accurate check on the profits or losses of each cow. Such is one of the aims of the Dairy Division of the Montana Department of Agriculture, Labor and Industry.

Breed Organizations.

Through the assistance of the Dairy Division, cooperating with the dairymen, Montana has gained a number of breed associations and milk dealers' associations. During the past six months two state-wide organizations were formed, the Montana Guernsey Breeders' Association and the Montana Jersey Breeders' Association, besides a number of local county organizations.

These associations are actively engaged in the promotion of particular breeds of cattle that are adapted to the climatic conditions of Montana. Literature describing the merits of each breed is distributed, with the result that the dairyman is able to select the breed most suitable for his condition. Definite standards are



Eight Cows, Hofstetter's Herd, Lewistown; Average Butter Production, 1,008 Pounds.

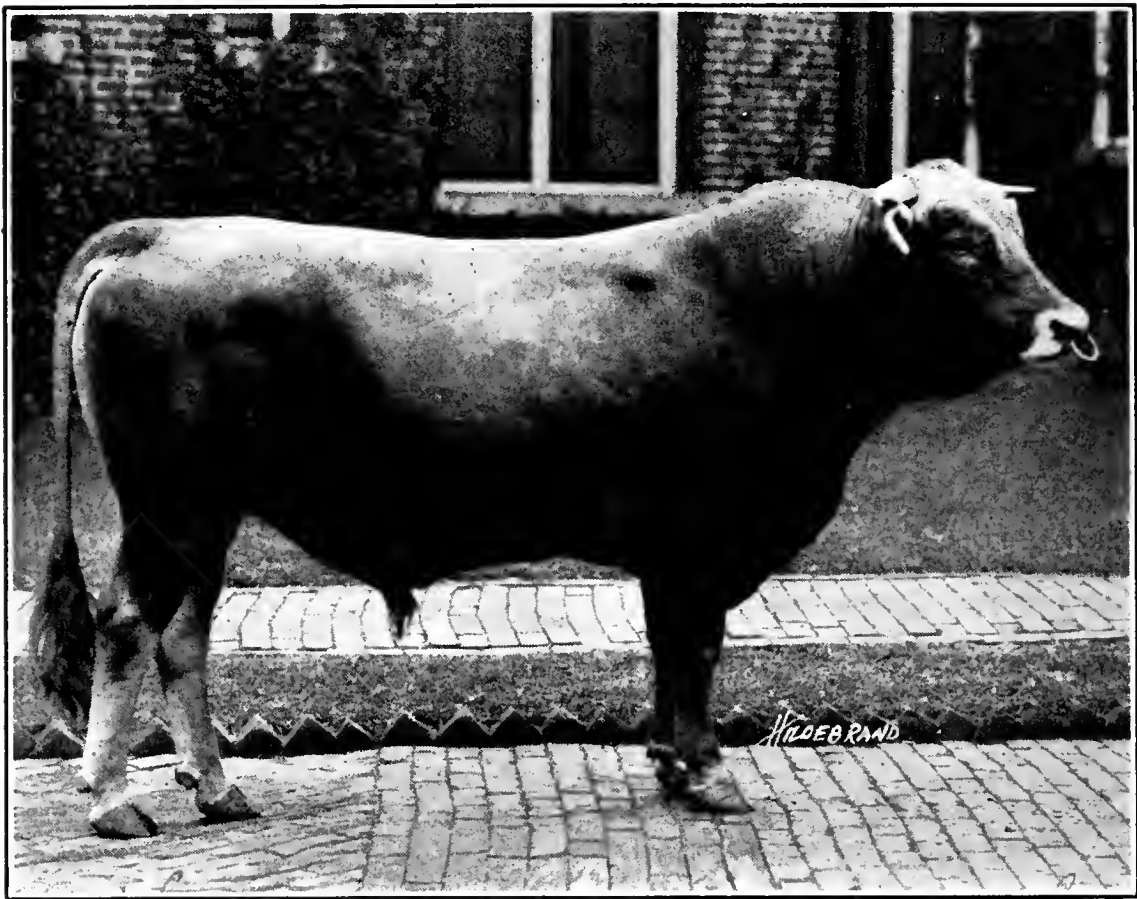
set by these organizations and cows that meet them may be registered and records thus kept showing through the years the blood lines and production of offspring. The work of the organizations is assisted through securing speakers of note to come to the state and address farmers and dairymen on the various phases of dairying.

Extension Program.

The Dairy Division is striving to carry out a number of plans to better the industry of dairying through extension educational work. Meetings are held in various localities where dairying is one of the leading means of livelihood and encouragement is given the farmer and dairyman along the lines most needed in that locality. Assistance is rendered them by placing them in contact with financial agencies through which they may secure aid in obtaining more and better dairy cows on reasonable terms. Results are already showing in this work and the office of the Division receives many inquiries as to the procedure to be followed in improving the herds with additional or better dairy cows. The Montana Dairy Products Manufacturing Association is backing up the Dairy Division in a program to increase the dairy herds of Montana with 1,700 additional dairy cows in 1926. Especial care is being taken in the selection of these cows in order that none but high grade producers are obtained. Picture slides have been made of the more prominent herds of the state and are shown wherever possible, with the result that the people desiring to increase or improve their herds are acquainted with the best obtainable in the State, and in many instances have not had to leave Montana for their buying of additional cattle. A slogan for this activity has been adopted by the Division, entitled "Montana Purebred Dairy Cows for Montana People."

The Montana Dairy Council.

The Montana Dairy Council has been made a permanent organization and has already begun to carry out an educational program in the schools of the State. Increased consumption of dairy products is being sought through this educational program, and the ultimate result will be seen in the healthy condition of children using them.



Typical Brown Swiss Herd Sire Owned by W. O. Bohart, Bozeman.

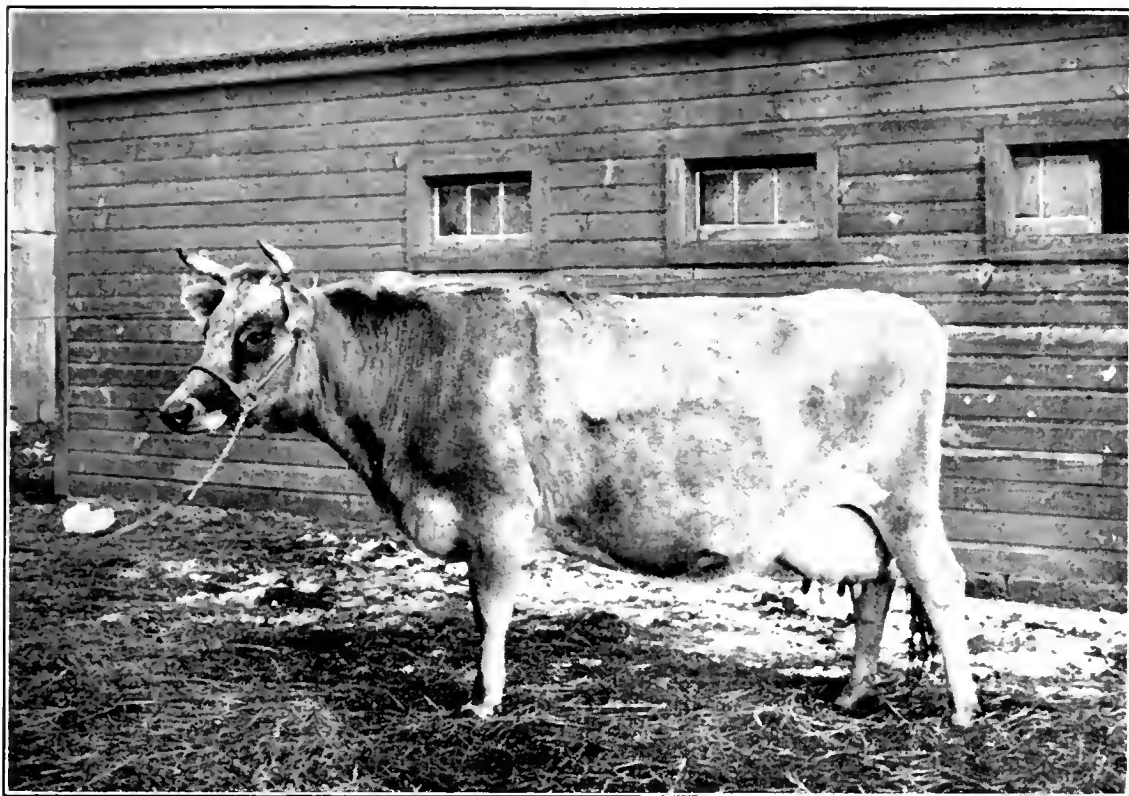
Production Records.

During the past year a wonderful advancement has been made by purebred breeders of the State in demonstrating what actually can be done with a good dairy cow when she is properly handled and fed. Johanna "Aggie" Homestead, owned by O. K. Iverson of Kalispell, proved this by producing 31,911.4 pounds of milk and 1,034 pounds of butter in 365 days. It is further proved by Echo's Fairy Lass, owned by Archie McKillop of Hamilton, when she produced 13,475 pounds of milk and 706.2 pounds of butterfat in 365 days. She is the only gold medal cow in Montana. Her milk tested for the entire period an average of 5.24% butterfat. She carried her calf for 320 days of the test and freshened just 14 months after previous calving. This cow's normal weight is 850 pounds, so that she almost produced her own weight in 85% butter. A number of other outstanding records have been made by grade Guernseys and Jerseys throughout the State, with butterfat records for the 365 day period ranging from 350 to 650 pounds of fat.

The following table, prepared from the records of the Dairy Division, will give a fairly accurate idea of the development of the industry from 1921 to the current year:

Yearly Production Reported.

	1921	1922	1923	1924	1925
Butter	7,464,679 lbs.	7,815,847	10,721,595	14,178,938	14,795,010
Cheese	158,559 lbs.	188,889	814,907	934,065	1,404,558
Ice Cream	481,160 gals.	355,041	711,762	564,676	761,636



"Echo's Fairy Lass," Montana's Only Gold Medal Cow.

The number of cheese factories has trebled since 1918 and numbers eight at the present time, with prospects of two or possibly three more in the near future. Both creameries and ice cream factories have doubled since 1918. The present status of cream stations cannot be definitely stated as to number, but there are approximately 215, and are daily increasing. The value of milk and milk products, butter and cheese has been estimated at \$7,282,000 for 1924 and \$8,859,000 for the year 1925. Statistics furnished the Division show that the Treasure State sale of butter in San Francisco in 1925 was nearly triple that of 1924. In 1924 she disposed of 770,000 pounds of butter in San Francisco, while Oregon sold 948,000 pounds and Washington furnished 606,000 pounds. In 1925 Montana sold 1,896,000 pounds of butter there while Oregon sold but 1,195,000 pounds, and Washington furnished 496,000 pounds. Such data would indicate that Montana is in a position to take over a large share of the coast business that is now going to distant states. She would be able to take over her share of such business, due to the fact that with the present equipment of the creameries and plants an increase of approximately fifty per cent could be handled without further investment in equipment. It is the aim of those interested to increase production to an extent that will require the various plants of the State to operate at full capacity throughout the year.

The market price of butterfat has been steady and dependable and the recognition of the superior food value of dairy products has increased consumption. The industry in general has been strengthened by higher type dairymen entering into the business and better cooperation between manufacturer and producer has resulted.

Milk Production Study.

Regular reporters each month are asked the following questions relative to milk production on their farm on a specific day: (A) Number of cows milked on your farm yesterday. (B) Number of all milk cows, dry or in milk, in your

herd yesterday. (C) Total production of milk by your herd yesterday in either pounds or gallons.

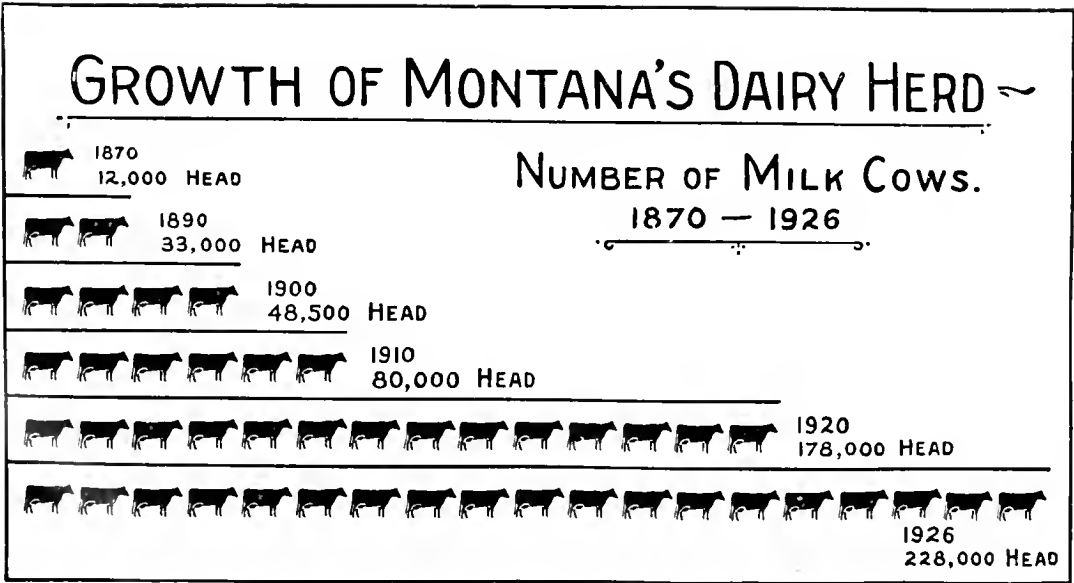
While this monthly survey has been in operation but little over a year, and much of its value will lie in comparisons that will be built up as the records increase, the results of the 1925 reports will be of interest to reporters cooperating in this study and are therefore summarized as tentative figures, for such months as the data was found to be representative. It is expected that the representativeness of the data will increase, since reporters have shown considerable interest in this survey in numbers of returns made each month.

RESULTS OF 1925 MILK PRODUCTION INQUIRIES

MONTH	No. of Farms	Milk Cows in Herd	Number Milked	Production Total lbs.	Percentage of Herd Milked	Ave. lbs. Milk per Cow#
April	263	1903	1050	19,022	55.2	18.11
May	298	2439	1471	31,619	60.3	21.49
June	250	1829	1183	25,449	64.7	21.51
July	257	2221	1541	31,236	69.3	20.27
August	300	2303	1540	30,254	66.9	19.64
September ..	250	1943	1168	20,582	60.1	17.62
October	269	2110	1281	21,561	60.7	16.83
November ..	252	1962	1049	18,809	53.4	17.93
December ..	303	2341	1363	21,945	58.2	16.10
Average						
9 Months	271.3	2116.8	1296.2	24,497.4	61.2	18.90

#Average pounds for cows milked on last day of month preceding.

January 1	Cows and Heifers 2 yrs. & over kept for Milk	Heifers 1-2 yrs. for Milk	Total
1926	192,000	36,000	228,000
1925	187,000	35,000	222,000
1924	174,000	35,000	209,000
1923	162,000	30,000	192,000
1922	155,000	30,000	185,000
1921	148,000	33,000	181,000
1920	148,000	30,000	181,000



HORTICULTURE



The Montana McIntosh Apple Tops Eastern Markets—Horticulture in Infancy—Early History.



By Fred T. Parker.



Pears and a Silver Dollar.

Missoula, and William Tiedt at Darby. All of whom planted considerable acreage. These were the real pioneers in Horticulture in Montana.

Up until about 1915 the main discussion at every meeting of the Montana Horticultural Society, which was organized in Missoula in 1898, was, "What is the best apple to grow in Montana?"

During the winter of 1896 the first meeting of the Montana fruit growers was called at Stevensville. The second meeting was held at the same place during the winter of 1897. On February 3, 1898, the fruit growers of the State again met at Missoula and organized the Montana Horticultural Society. This organization just held its twenty-ninth annual meeting at Missoula on February 3 and 4 of this year. The Horticultural Society has done more for the industry than any other one thing in the State. It has worked out the best varieties of fruit, the best method of cultivation, irrigation, pruning and system of marketing. It was this organization that developed the high standard of grade and pack for the Montana apple by which it has gained such a high standard in the New York market.

Of later years it has been positively proven that the Montana grown McIntosh apple is the best McIntosh apple grown anywhere on this continent, and has for several years demanded the highest price of any apple on the eastern markets of the country. Many thousands of acres of apple trees have been planted in western Montana, and some of every known variety could



A Western Montana Orchard.

have been found here. Many of these orchards have been abandoned because they were not profitable, simply because they were trying to grow a variety that was not adapted to our soil or climate conditions. But those orchards planted in McIntosh are doing well and making good returns to their owners.

Up to the present time we have never been able to supply the demand for fancy and extra fancy McIntosh. Our annual crop is about 800 carloads of 756 boxes to the car.

Sour cherries and strawberries are becoming very important among horticultural products of this State. The sour cherry probably does better in the Bitter Root Valley than any place in the country, and it is not unusual for a grower to take as high as \$400 from an acre of Mount Montmorency or English Morello cherry trees. The sweet cherry has proven very profitable to the growers of the Flathead Lake region. The sweet cherry from this section comes in at a time when there is no other like fruit on the market, and, therefore, brings an unusually high price. Many seasons I have known them to sell at the orchard for as much as twenty cents per pound.

The everbearing strawberry has proven its adaptability to this section. A large acreage is now being grown and additional acreage is being planted this year. The main crop of the everbearing strawberry comes in the fall and at a time when there is no other berry on the market. Many growers report as high as 450 crates of berries per acre. The average price to the grower this past season was from \$2.00 to \$2.50 per crate. The acreage is now getting to a point when the growers can ship out in car load lots, which will enable them to reach the eastern markets where they demand the best prices. With the coming of the canning factories in the valley the sour cherry and strawberry industry are going to grow very rapidly.

Raspberries, blackberries, currants, gooseberries, and all other cane fruits do exceptionally well here, although up to the present time only a small acreage has been planted and not enough of these fruits are grown to supply the local markets. This past season the growers received as high as \$3.50 per crate for raspberries.

Many acres of land are still available in western Montana that are well adapted for the growing of apples, cherries, strawberries, raspberries, and all of the cane fruits.

Fruit growing when operated in conjunction with a dairy farm makes the best combination known in the farming industry. The refuse from the cow barn will keep up the fertility of the orchard or garden. Fruit will yield more per acre than any other crop the farmer can grow, and he is able to avoid the annual spring planting.

Our climatic conditions in western Montana are exceptionally adapted to the growing of fruit because the cool nights and warm days have a tendency to put both color on and flavor in the fruit. The same condition is also a wonderful help in the control of all the insect pests and diseases that usually work on fruit. We have no pests or diseases in our orchards today that we cannot control by either spray or cultivation.

The State government has always taken an active interest in the horticulture industry and maintains a Division of Horticulture which is one of the active divisions of the State Department of Agriculture.

The Division of Horticulture is headed by Edward Dickey, who maintains his office in Missoula, where he is easily accessible to all fruit growers. His efforts are to help the growers in every way possible. This Division main-

tains an active inspection service which inspects all outgoing shipments of fruit and keeps open the grade and pack so that the purchaser may be assured that the package contains the quality that is stamped thereon.

This is a very valuable service, as it has a tendency to standardize the Montana products and creates a better market. New York buyers have come to demand a state certificate of inspection from this Department on all car load shipments at the time of loading. This method of inspection by a disinterested inspector serves both the fruit grower and the buyer and the certificate protects both buyer and seller.

This Division also assists in active work of controlling and eradicating any outbreaks of insect pests and diseases which may occur in the orchard. It also assists in advising the grower as to the best methods of handling his orchard.

Without this active Division of Horticulture, fruit growing in Montana would be much more difficult.

**APPLES BY YEARS FOR MONTANA
(1909-1925)**

Year	Total Production (bushels)	Farm Value Per Bushel Dec. 1	Total Farm Value of Crop Dec. 1
1909	567,000	#	#
1910	420,000	\$1.20	\$ 504,000
1911	900,000	1.15	1,035,000
1912	900,000	1.03	927,000
1913	840,000	1.42	1,192,000
1914	900,000	.76	684,000
1915	1,041,000	.93	968,000
1916	768,000	1.10	845,000
1917	1,044,000	1.00	1,044,000
1918	792,000	2.10	1,663,000
1919	850,000	1.75	1,488,000
1920	825,000	1.80	1,485,000
1921	975,000	1.50	1,465,000
1922	610,000	1.00	610,000
1923	990,000	1.30	1,287,000
1924	290,000	1.29	374,000
1925	80,000	1.75	140,000

No data available.

Compiled by U. S. Division of Crop and Livestock Estimates cooperating with the State Department of Agriculture.

AVERAGE VALUE OF PLOW LANDS PER ACRE

MARCH:	Poor Plow Land			Good Plow Land			All Plow Land		
	Mont.	Iowa	U. S	Mont.	Iowa	U. S	Mont.	Iowa	U. S
1925	\$12	\$100	\$42	\$28	\$162	\$81	\$19	\$135	\$63
1924	13	107	43	30	169	82	21	143	64
1923	14	115	45	31	181	85	22	153	67
1922	15	119	47	35	193	89	23	163	70
1921	19	145	57	41	238	106	30	200	84
1920	21	157	61	48	257	113	36	219	90
1919	21	129	51	45	196	92	34	169	74

Tables prepared by Federal Division Crop and Livestock Estimates cooperating with the Montana State Department of Agriculture.

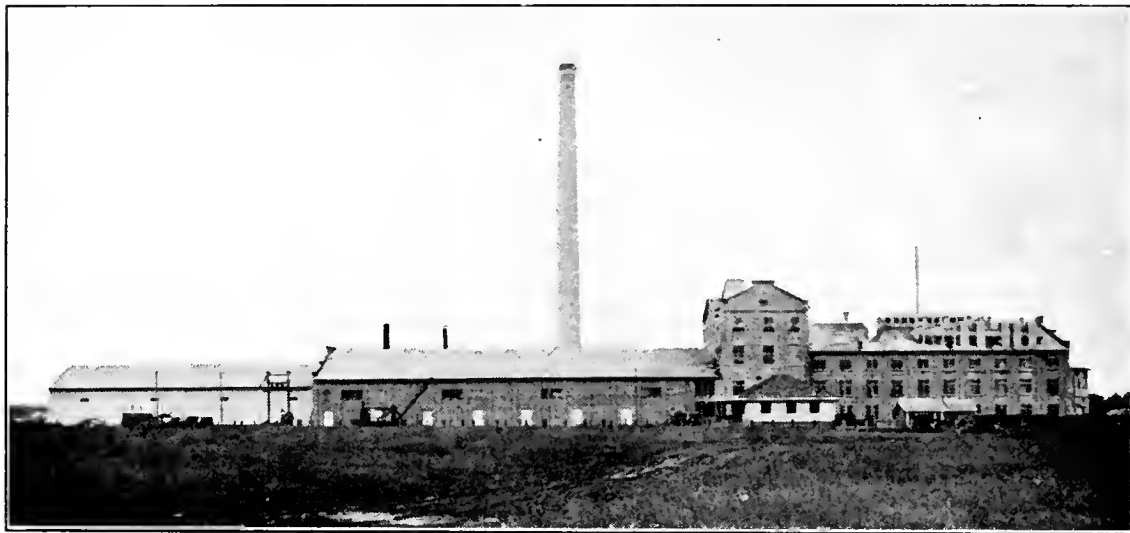
SUGAR BEETS



*Two New Factories in Past Year—Pioneer Factory at
Billings Points Way.*



By Bailey Hutchins.



Sugar Beet Factory at Chinook.

During 1925 Montana has made decided progress toward increasing her sugar beet and beet sugar production. The State's pioneer refinery at Billings has been operated since 1906 by the Great Western Sugar Company, and, in addition, two new beet sugar factories have been constructed during the past summer—one by the Utah-Idaho Company at Chinook, which is to be supplied with beets grown in the Milk and Sun River Valleys; the other by the Midland Sugar Company at Sidney, to be supplied with beets grown in the lower Yellowstone Valley and on the Williston project.

It is estimated that the 21,000 acres of beets grown in the Billings territory will produce about 250,000 tons of beets, for which growers are guaranteed a minimum of \$6.50 per ton and from which approximately 700,000 100-pound bags of sugar will be produced. The Billings growers received from the 1923 crop a total of \$9.01 per ton and from the 1924 crop a total of \$8.17 per ton. As this is a cash crop it is very apparent that business throughout that territory will be stimulated from this source alone. In addition to the cash distributed by the Great Western Sugar Company directly to Billings growers, approximately \$350,000 will be paid to a total of about 800 factory employees during the current operating season and over \$800,000 to the railroad companies for freight upon beets, sugar, by-products, coal, coke, lime rock and other supplies, besides a considerable sum to local mercantile establishments for materials necessary to maintain and operate its different forms of equipment.

Current reports indicate that between 5,000 and 6,000 acres of beets have been grown for the Chinook factory which should enable that factory to convert probably 60,000 tons of beets into sugar. Proportionately, the Chinook country will



Note the Large Beets and Tops and Uniform Size and Stand.

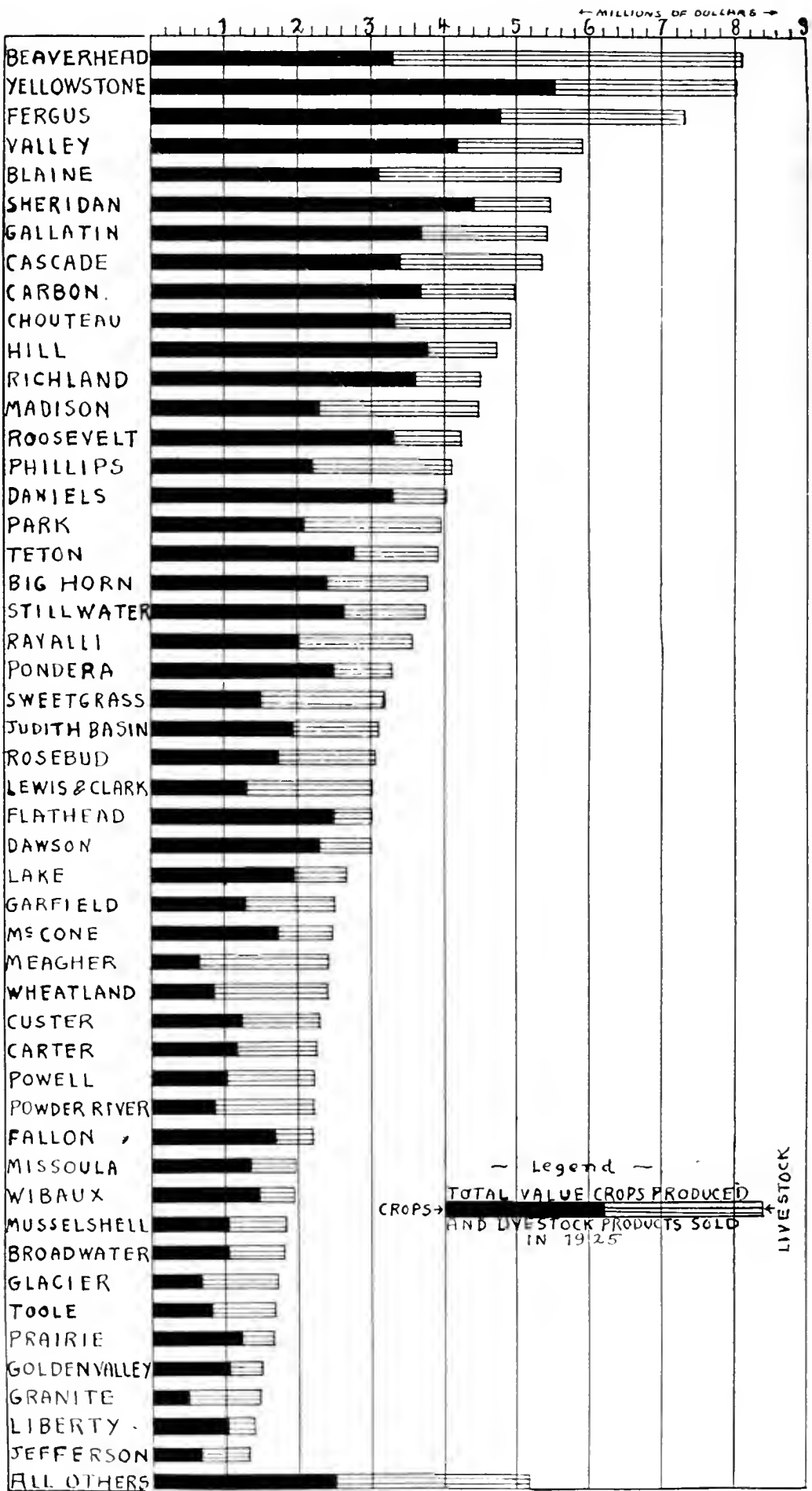
receive the same benefits as the growers in the Billings country. The establishment of a factory there and at Sidney will enable both of these territories to engage in stock feeding, the benefits from which are so apparent to anyone familiar with conditions around Billings.

Over 7,000 acres of beets have been grown for the Sidney factory, and it is estimated that the State as a whole will produce a total of 380,000 tons of beets which will yield a total of 1,000,000 100-pound bags of sugar. The growers over the State, in turn, will receive \$2,500,000 as a guaranteed payment and possibly \$2 or even more per ton in additional payments amounting to another three-fourths of \$1,000,000, dependent upon the net price received by the various companies for their finished product.

DURUM WHEAT PRODUCTION

STATE:	1925			1924		
	Acreage 000 Omitted	Yield Per Acre	Production 000 Omit- ted (bu.)	Acreage 000 Omitted	Yield Per Acre	Produc- tion 000 Omitted Bushels
Montana	121	10.0	1,210	126	18.0	2,268
North Dakota	3,362	14.5	48,749	2,992	16.2	47,336
South Dakota	1,049	13.8	14,476	997	15.3	15,254
Minnesota	142	15.2	2,158	126	21.5	2,709
Four States	4,674	14.2	66,593	4,171	16.2	67,567

MONTANA: RESOURCES AND OPPORTUNITIES



CROP SALES IN MONTANA



*Crops and Livestock Marketed Valued at Total of
\$122,533,000 in 1925.*



By J. G. Diamond.

Combined farm sales from 1925 crops and value of livestock products marketed during the calendar year will total \$122,533,000 compared with the revised estimate of \$124,474,000, the total for 1924. In this total a decrease of about 17 million dollars in sales of farm crops compared with the preceding season is very nearly offset by an increase of little more than 15 million dollars in sales of livestock and livestock products.

The value of farm sales of crops produced in 1923, 1924 and 1925, values of sales of livestock and livestock products and total farm sales of the three years are placed as follows by the joint estimate of Montana State Department of Agriculture and the Federal Division of Crop and Livestock Estimates:

YEAR	Value of Crops For Sale	Value of Livestock Sales	Total Farm Sales
1923	\$46,784,000	\$50,872,000	\$ 97,656,000
1924 a	74,343,000	50,131,000	124,474,000
1925 b	57,360,000	65,173,000	122,533,000

(a) Revised estimate for 1924. 1923 final estimate.

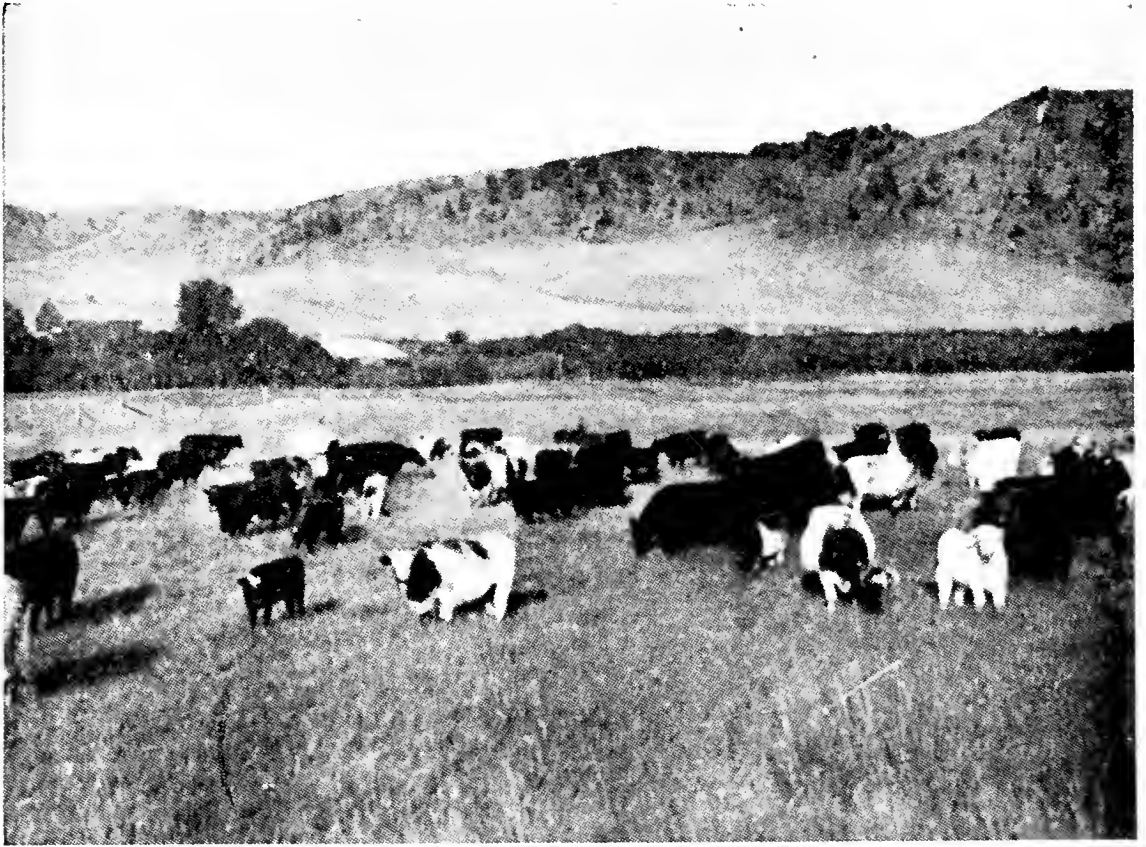
(b) Preliminary estimate for 1925 subject to revision next December.

Cash from livestock sources in 1924 fell below the contribution made by crop sales, the large grain crop of that year causing this shift. In 1925 as was also the case in 1923, livestock sales have exceeded sales of crops. The total sales dollars of Montana farmers during the past three years has therefore been divided as follows:

YEAR	Crop Sales	Sale of Livestock, etc.	Total Sales Dollar
1923	47.9 cents	52.4 cents	100.0 cents
1924	59.7 cents	40.3 cents	100.0 cents
1925	46.8 cents	53.2 cents	100.0 cents

In the above estimates the values of crop sales in the years compared represent, at the time estimates are made, some portion of crops still in farmers' hands that is not sold by the end of the calendar year. Valuations are based on the December 1 farm prices as determined by the U. S. Department of Agriculture. The total figures have their chief value in the relative changes they show between the years compared and must not be considered as an actual measure each year of cash income, which would be difficult to obtain closely even at the close of the crop marketing season still several months away. However, with all years considered on the same basis the comparisons tend to become the same as that which would be furnished by an actual computation.

Cash sales of crops are based upon the estimated surplus above farm needs of feed, seed and food and tends to eliminate largely, such duplication in livestock values where crops are fed on farms, but cannot eliminate a small duplication arising in cases of farmers purchasing locally feed for livestock that are later



Beef Herd.

marketed. The cash sales of livestock and livestock products are based on marketings and estimated slaughter within the state of cattle, sheep and hogs during the calendar year ending December 31. Other items in the livestock group are estimated conservatively from such data as is available, and on approximately the same basis each year.

The conclusion to be drawn from the combined estimates of farm sales is that despite a loss in crop revenue, the state as a whole will receive nearly as much income from agricultural sources as in 1924.

The distribution of this income in the case of crops shows a lower return for the grain farmers compared with last year, and about the same to slightly lower returns to the more diversified farmers, excepting in some cases such as commercial potato growers where a special crop has returned a better yield or secured a better price.

The distribution in case of livestock shows a further moderate improvement in the sheep industry and a rather marked improvement in the cattle industry due to the general advance of the levels of cattle prices during the past year. The swine industry, which in Montana is tied up largely with the small farm and the more diversified farming, has also benefitted by the general improvement in hog market values. Some of this benefit offsets losses in crop income in these cases. Likewise the dairy industry in the state is tied up more closely with the small farm, where it has tended to help out crop income, through somewhat better prices of dairy products.

FARM SALES 1925 AND 1924

FROM CROPS:	1924		1925	
	Total Value	Sales	Total Value	Sales
All Wheat	\$ 64,230,000	\$55,879,000	\$ 48,243,000	\$39,345,000
Oats	7,903,000	1,580,000	7,608,000	1,393,000
Barley	1,794,000	269,000	2,358,000	377,000
Rye	1,019,000	204,000	1,036,000	207,000
Flax	4,729,000	4,398,000	2,684,000	2,334,000
Corn	7,484,000	748,000	6,255,000	625,000
All Hay	26,310,000	3,947,000	25,613,000	4,352,000
Potatoes	2,603,000	911,000	6,048,000	2,419,000
Apples	374,000	101,000	140,000	42,000
Beans	1,346,000	1,076,000	1,525,000	1,181,000
Peas	657,000	526,000	1,265,000	961,000
Sugar Beets	3,967,000	3,969,000	3,080,000	3,080,000
Alfalfa Seed	680,000	305,000	1,225,000	644,000
Other Crops	3,300,000	430,000	3,080,000	400,000
Total Above	\$126,396,000	\$74,343,000	\$110,160,000	\$57,360,000

FROM LIVESTOCK:	Sales 1924	Sales 1925
Cattle	\$19,215,000	\$26,477,000
Sheep and Lambs	8,036,000	9,926,000
Wool	7,465,000	9,156,000
Milk and Milk Products c/	7,282,000	8,859,000
Hogs	3,566,000	5,685,000
Poultry	2,926,000	3,500,000
Horses	1,465,000	1,320,000
Honey and Wax	176,000	250,000
Total from Livestock Sources	\$50,131,000	\$65,173,000
Crop and Livestock Sales Combined	\$124,474,000	\$122,533,000

c/ Dairy products estimated here do not include value added by manufacture after leaving farmers hands.



Montana Angora.

TONNAGE PRODUCED 1925 AND 1924

CROP:	1925 Tonnage	1924 Tonnage ±
Corn	211,680	184,352
All Wheat	1,553,970	1,038,030
Oats	264,040	229,630
Barley	62,400	78,624
Rye	31,360	39,200
Flax	59,920	34,160
All Hay	2,693,000	2,619,000
Potatoes	89,760	113,400
Beans	12,240	15,000
Apples	6,960	1,920
Other Crops	9,971	16,125
Total	4,995,301	4,369,441

± 1924 estimates revised; 1925 preliminary subject to revision December, 1926.

ESTIMATED PERCENTAGE OF MONTANA MAIN CROPS SOLD 1925

CROP:	Per Cent Sold	CROP:	Per Cent Sold
Wheat	83.0	Corn	10.0
Oats	17.0	Hay	17.0
Barley	16.0	Potatoes	40.0
Rye	20.0	Apples	30.0
Flax	87.0	All Crops Combined	53.2

YIELDS PER ACRE

CROP:	1925	1924	1923	Average (1920-24)
Spring Wheat	10.5	16.2	14.0	13.3
Winter Wheat	14.5	17.1	17.0	15.1
Corn	16.5	18.0	26.0	20.1
Oats	22.5	29.5	33.0	28.1
Barley	21.0	25.0	25.5	22.8
Rye	12.5	14.0	11.0	11.6
Flaxseed	4.5	8.7	8.2	6.3
Potatoes	108.0	88.0	110.0	108.8
Tame Hay ±	1.65	1.71	1.88	1.76
Wild Hay ± .....	.90	.90	.91	.89
Beans	12.5	12.0	11.5	12.2

(± Yield per acre for hay in tons, other crops in units of bushels.)

ESTIMATED WEIGHT PER MEASURED BUSHEL MONTANA GRAIN (Pounds)

	10-yr. average	1921	1922	1923	1924	1925
Winter Wheat	59.1	59.9	60.3	59.4	60.3	58.0
Spring Wheat	59.1	59.0	59.8	59.8	59.5	58.0
Oats	36.1	35.0	36.0	37.2	36.5	36.0
Barley	48.6	47.1	50.0	49.0	50.0	49.0

NOTE:—Tables showing the acreage, yield, and total production of all major crops by counties will be found in the Chapter in this Volume entitled "The Counties of Montana."

THE LIVESTOCK INDUSTRY



*In Early Days Buffalo in Countless Thousands Roamed the Plains—
Natural Conditions Favorable to Livestock—Montana's
Tremendous Production.*



"Montana in 1867 was the greatest game country in the world, not excepting Africa or South America, and there was no section of the known world of the territorial size of the present Montana that contained as many buffalo, elk, deer, antelope, beaver, coyote, bear and wolves as did this territory," said David Hilger, Montana State Historian, to a representative of the publicity division of the Department of Agriculture, Labor and Industry.

"I crossed the plains via the ox team route from Big Stone Lake and Devil's Lake, North Dakota, and up the Milk River via Fort Benton and Helena in 1867, and the enormous herds of buffalo, especially along the Milk River, are well impressed in my mind," Mr. Hilger continued. "It would be almost unbelievable if I told you that for days and days along the great stretches of open prairie land on either side of the Milk River there could be seen countless thousands of buffalo in every direction, so much so as to actually endanger the emigrant train in its long serpentine formation on its westward course. I have been a passenger on steam boats going from Fort Benton down the river when the main deck and the "hurricane" deck were piled high with bales of raw buffalo hides."

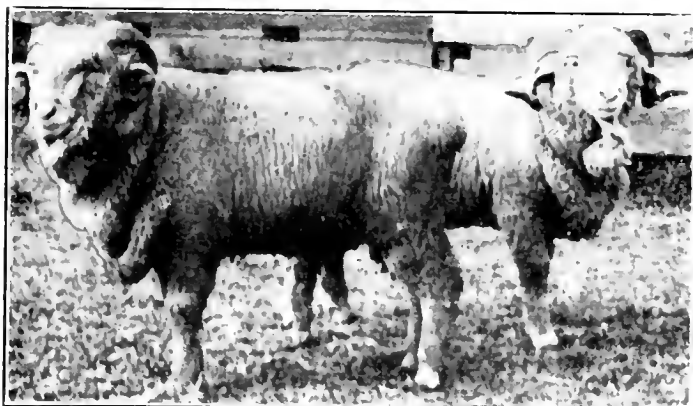
Thus, Montana has always been a great stock country. Here the wild animals found sustenance in nutritive grasses long before the arrival of the white man.

Mining was the State's first industry; the miners blazed the pioneer trails, but close behind the miner came the cowman. Across the plains, through the mountain passes, he trailed his herds, often braving new dangers at every sunrise.

The livestock business is today the third industry in the state. Last year the products were valued at \$65,173,000, an increase of \$15,042,000 over 1924. At the beginning of 1926 Montana had 1,280,000 cattle, 576,000 horses, 2,837,000 sheep, and 280,000 swine. The table on the following page giving the numbers of livestock in the State from 1870 to 1926 will indicate Montana's forward stride.

As early as 1832 there were cattle in what is now Montana. These were work oxen used for freighting supplies to trading camps, and dairy stock. The pioneers of the cattle industry are said to be Kohrs and Beilenberg, who, in 1864, trailed a herd into the Deer Lodge Valley. The first market shipment of cattle is thought to have been made in 1868, the market being Salt Lake





City. The first Texas drive to Montana is placed at 1869; the first shipment by rail in 1874.

Ten years after the coming of the railroads the shipments of cattle increased to 79,000 head. From the year 1885 until 1926 almost 9,000,000 cattle have been shipped from Montana to outside markets. It is difficult for the average man to com-

prehend such large figures. Stated in another way, it means that estimating the average dressed weight at 550 pounds, Montana has supplied her own needs and in the last forty years shipped outside the State almost five billion pounds of

NUMBERS OF LIVESTOCK
(1870-1926)

YEAR	Milk Cows	Other Cattle	All Cattle	Horses	Sheep	Swine	Mules
1870	12,400	24,000	36,400	5,300	2,000	2,600	500
1880	11,500	162,000	173,500	36,000	185,000	10,500	900
1883	14,000	590,000	605,000	39,900	405,000	17,000	900
1884	14,200	672,600	686,800	45,900	466,000	17,500	1,000
1885	23,000	615,000	638,000	105,000	625,000	19,000	2,800
1886	25,300	725,700	751,000	120,700	719,000	19,000	8,000
1887	29,000	812,800	841,800	129,000	755,000	20,000	9,200
1888	31,000	934,500	965,500	187,000	1,265,000	22,000	5,500
1889	31,400	962,500	993,900	200,000	1,391,000	23,000	5,300
1890	33,000	981,800	1,014,000	216,000	1,990,000	29,000	2,400
1891	34,000	932,700	966,700	152,000	2,089,000	35,000	1,800
1892	35,700	1,026,000	1,061,700	197,000	2,089,000	35,000	1,200
1893	36,400	1,036,000	1,072,400	207,000	2,528,000	39,000	1,200
1894	36,400	1,057,000	1,093,000	197,000	2,781,000	39,000	900
1895	39,000	1,078,000	1,117,000	198,000	2,809,000	46,000	900
1896	42,000	1,154,000	1,196,000	183,000	3,061,000	52,000	900
1897	43,000	1,177,000	1,220,000	175,000	3,122,000	51,000	900
1898	42,700	1,082,000	1,510,000	171,800	3,248,000	47,000	900
1899	44,000	953,000	997,000	165,000	3,378,000	42,300	1,000
1900	48,500	926,500	975,000	347,000	6,170,000	50,000	2,800
1901	49,400	960,200	1,009,600	302,000	6,417,000	47,000	3,400
1902	50,000	998,000	1,048,000	275,000	5,081,000	49,000	3,400
1903	52,400	1,048,000	1,101,000	246,000	5,120,000	51,700	3,400
1904	53,900	1,059,000	1,112,900	244,000	5,270,000	54,800	3,400
1905	55,000	1,048,000	1,103,000	236,000	5,639,000	57,600	3,400
1906	61,600	965,000	1,026,600	239,000	5,752,000	59,900	3,600
1907	66,000	916,300	982,300	292,000	5,537,000	62,900	4,000
1908	69,000	879,000	948,000	292,000	5,524,000	66,000	4,000
1909	75,000	905,000	980,000	304,000	6,634,000	68,000	5,000
1910	80,000	842,000	922,000	319,000	5,747,000	75,000	5,000
1911	80,000	818,000	898,000	344,000	5,230,000	124,000	4,500
1912	91,000	732,000	823,000	350,000	4,926,000	145,000	5,000
1913	95,000	750,000	845,000	385,000	4,675,000	168,000	5,500
1914	104,000	826,000	930,000	440,000	3,850,000	187,000	6,000
1915	114,000	836,000	950,000	485,000	3,340,000	245,000	6,500
1916	125,000	1,035,000	1,160,000	520,000	3,020,000	270,000	7,000
1917	140,000	1,114,000	1,254,000	580,000	2,670,000	260,000	7,500
1918	150,000	1,310,000	1,460,000	640,000	2,380,000	202,000	8,500
1919	163,000	1,447,000	1,610,000	720,000	2,530,000	180,000	9,000
1920	178,000	1,192,000	1,370,000	669,000	2,083,000	167,000	9,000
1921	181,000	1,088,000	1,269,000	669,000	1,973,000	160,000	9,000
1922	185,000	1,195,000	1,380,000	650,000	2,270,000	180,000	10,000
1923	192,000	1,168,000	1,360,000	643,000	2,315,000	225,000	10,000
1924	209,000	1,151,000	1,360,000	611,000	2,370,000	292,000	11,000
1925	232,000	1,112,000	1,340,000	596,000	2,579,000	280,000	11,000
1926	228,000	1,052,000	1,280,000	576,000	2,837,000	280,000	11,000

Table prepared by Federal Division of Crop & Livestock Estimates cooperating with State Department of Agriculture.

meat for consumption elsewhere, beef enough at the average consumption in the United States of 68 pounds per capita to furnish meat for 72,000,000 people for a year.

A discussion of the present and past trends of the industry has been prepared by the joint statistician of the Montana Department of Agriculture, Labor and Industry and the United States Department of Agriculture as follows:

Cattle in Montana.

The first thirty years the industry was conducted on the old order of large outfits and open range. During the next twenty years the influx of settlers steadily encroached upon the stockmen, forcing many of the old-time outfits out and off the range. However, many changed their methods to conform to the changing order, of fenced range and hay ranches. While many of the picturesque phases of the industry and many of its famous actors passed off the stage with the changing order, the industry itself has continued to hold its relative importance in the State's agriculture. From 1870 numbers increased from 36,400 to 1,510,000 in 1898. During the early part of the next decade they had dropped as low as 975,000 head, from which point there was a gradual recovery to 1,112,000 head in 1904, another decline to 823,000 head in 1912 and then a recovery to the highest point in the history of the industry to 1,610,000 head in 1918. Subsequent to 1918 the general trend has been to lower numbers. The drouth of 1919 and the ensuing hard winter resulted in the heaviest marketings in the State's history, totalling 641,337 head for the calendar year of 1919 ending December 31st. The post war deflation of cattle values together with stubbornly high production costs were a tribulation to the industry during the period 1920-1924, although the rise in beef prices setting in with the marketing season of 1925 have been a late encouraging aspect.

While there are still large individual holdings of beef cattle, the old order of big outfits has been largely superseded by the smaller herd and farm cattle. There is also a growing tendency to market younger stuff than in the old days and much progress has been made along the line of improving quality and adopting earlier maturing types. Montana can easily maintain a much larger cattle population and with the gradual stocking of the smaller farms will further expand her beef cattle industry as prices and production costs become more favorable.

Sheep.

Eighteen hundred and fifty-seven is the date credited with bringing the first flock of sheep into the Bitter Root Valley in western Montana. The Federal census of 1870 gave the State a total of 4,212 head and that of 1880 gave us 249,978 head. During the next twenty years the sheep industry experienced its greatest expansion, reaching a total of 6,170,000 in 1900, and the peak of the



Sheep in Pondera County.



Central Montana Farm Home.

industry in the following year when 6,417,000 head were estimated by the United States Department of Agriculture. During the next ten years there was a gradual downward tendency, the number falling to 2,530,000. A still further reduction came with the deflation of sheep values in 1920 and 1921, but this was short lived, and with improving markets for both wool and lambs numbers gradually rose during the next three years, attaining a total on January 1, 1926, of 2,837,000 head, according to the latest joint estimate of the Federal Department of Agriculture.

The many natural advantages offered by Montana range conditions for producing a fine quality of mutton and wool promise to make the sheep industry an important phase of the State's agriculture for many years to come. Sheep-men during the past three years have also been relatively more prosperous, taken as a group, than any other agricultural class. Even with somewhat lower prices than those now prevailing for sheep and wool, the sheep industry of the State would continue profitable.

Montana sheep produce a high quality of wool and on the average 20 per cent of her clips class as fine and 80 per cent as medium. Weights per fleece are also high, as shown by the fact that the State average over a period of 22 years has ranged from 6.8 pounds to 8.3 pounds per fleece.

Swine.

From 2,600 head of swine returned by the Federal census of 1870 to 280,000 head, according to the latest joint estimate of the Federal Department and the State Department of Agriculture on January 1, 1926, is the record of the swine population in Montana during the past fifty-six years. Until 1911 the number was less than 100,000; the largest relative increase coming in the past fifteen years coinciding closely with the development of corn acreage during that period. Prior to 1920, hog production in Montana only moderately exceeded the State demand, but with the increase since that time hog shipments have been a contributor of increasing importance in the State's annual livestock income. The coming of the hog has provided new outlet for such feeds as alfalfa pasture, clover and other legumes, corn, barley, rye, skim milk and other feeds. Montana's climate is more favorable in most sections for breeding and saving spring pigs than is the climate of more important hog producing states east of Montana.

With the coming of the smaller farms, hogs, appear destined to play an increasing part in the future cash income of farmers.

Western markets have continued to absorb the large share of Montana's hog shipments. The peak of these shipments came in the calendar year ending December, 1925, when the output totalled 225,000 hogs. In 1924 the number was 167,000 and in 1920 only 41,000.

Horses and Mules.

The Federal census of 1870 gave the State about 5,300 horses and 500 mules. The horse population subsequently increased to a peak of 720,000 head in 1919, and according to the latest joint estimate of the United States Department of Agriculture and the Montana State Department of Agriculture the number on January 1, 1926, was 576,000. Mules likewise have increased from the early days, although their utilization in Montana has never been large, and the present number is about 9,000 head.

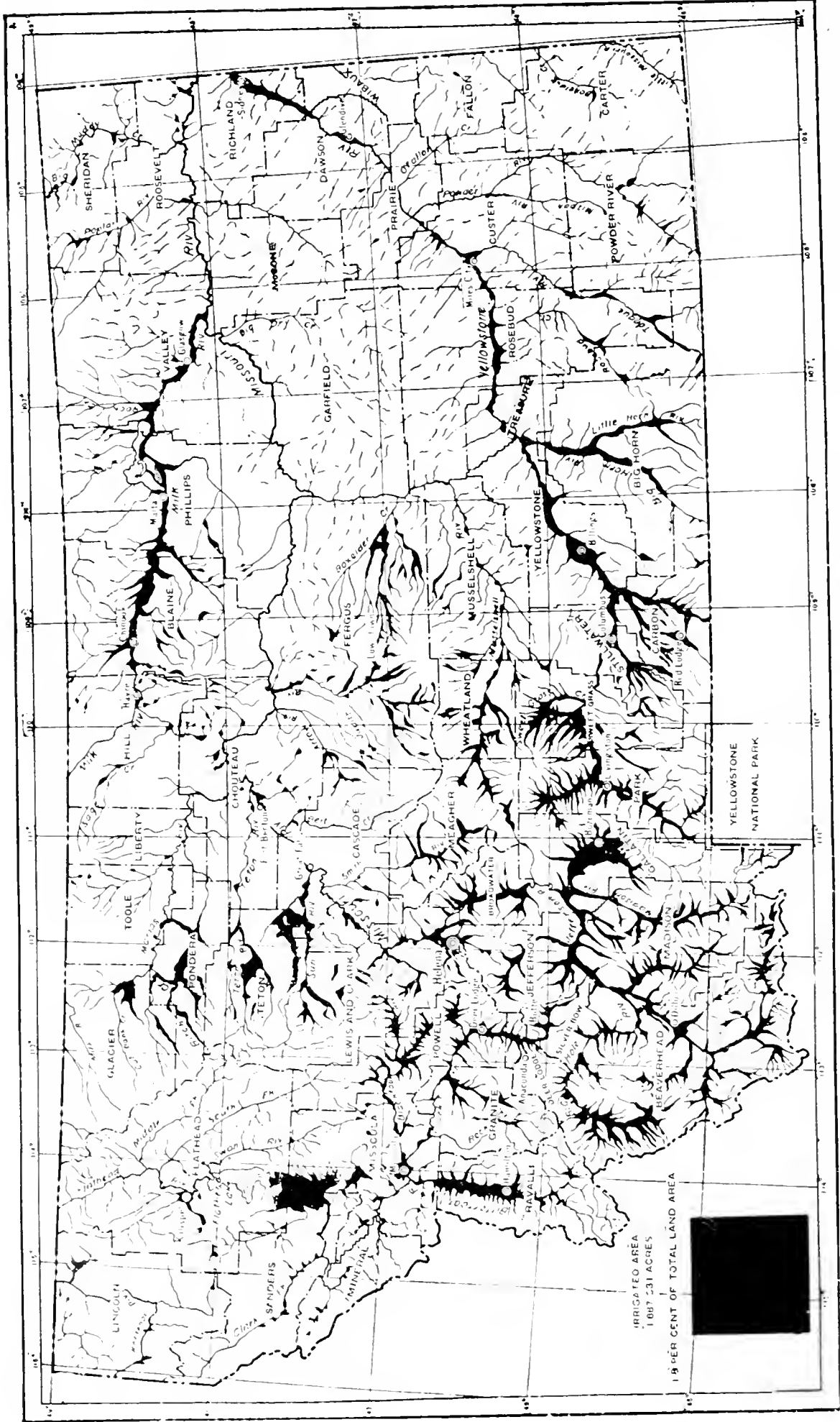
The heavy demand for horses during the Boer war marked the development of the Montana range horse, whose sale between the years 1895 and 1918 contributed a large share of the State's annual livestock income. Miles City became the trading point for horses and incidentally one of the largest horse markets in the world, to which came buyers from all parts of the world. Most of these range horses carried more or less good blood and through their dams traced ancestry to the famous old Spanish horses of the Southwest. With such blood and stimulated by the open range conditions under which they were bred, the product was one that was of high quality both as to spirit and stamina.

With the end of the World War and the competition of automobile and tractor, the range horse became a valueless surplus, and breeding has been greatly curtailed. In fact, at present such of the surplus existing in a semi-wild state on many of the ranges in various parts of the State have come to be regarded as a nuisance if not a detriment. During the past year many hundreds of the animals have been shipped east to canning factories, a situation that would bring tears to the eyes of many an old cowboy.

In farm breeding a heavier type of animal is now finding favor.



Dairy Herd.



IRRIGATION IN MONTANA

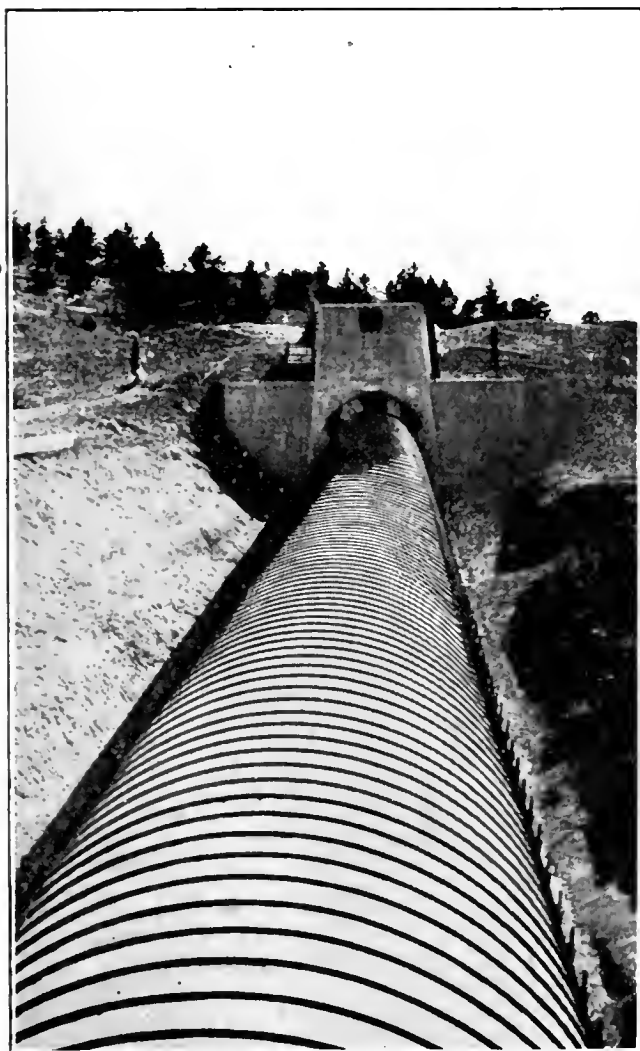


One of Leading Irrigation States—Six Million Acres in Montana May Be Irrigated—Projects Are Described.



By C. S. Heidel.

According to the latest census, Montana ranked fourth among the states in acreage of irrigated lands, being exceeded by California, Colorado and Idaho. It is generally conceded that Montana's streams afford a better water supply than do those of most of the Western states. Where the streams are properly measured and studied so as to realize their limitations as well as possibilities they are of inestimable value in providing water for limited areas. These irrigated tracts raise feed for stock and also offer great opportunities for the intensive farming of profitable high priced crops, such as sugar beets, beans, peas, garden truck and fruits. They afford a most valuable supplement to the greater areas of land without irrigation possibilities which are suitable for non-irrigated farming and grazing.



Intake End of Siphon Replacing Alkali Creek Flume, Billings Carey Project.

Father De Smet, who established St. Mary's mission near the present location of Stevensville, foresaw the value of irrigation. In a letter dated September 6, 1846, after referring to abundant crops of wheat, oats, and potatoes raised in the Bitter Root Valley, he wrote: " * * * Irrigation, either by natural or artificial means, is absolutely necessary to the cultivation of the soil, in consequence of the long summer drought that prevails in this region, commencing in April and ending only in October. This difficulty, however, if the country should ever be thickly settled, can be easily obviated, as the whole region is well supplied with numerous streams and rivulets. These remarks apply to the valleys contiguous to St. Mary's (or Bitter Root) the general aspect of them differing but slightly in regard to the heights of mountains, the colossal dimensions of the rocks, or the vast extent of the plains."

In the same letter he stated, "Two large rivulets, now almost useless, can, with a little labor, be made to irrigate the fields, gardens



Drops in Distributing Laterals, Valier Project.

and orchards of the village." That this thought was acted on before many years passed is shown by a water right decree dated April 10, 1905. It gives Kate H. McCormick and Maria T. Higgins 507 inches of water from Burnt Fork Creek for agricultural purposes, as of date July 1, 1852.

The earlier developments were by means of individual or small partnership ditches. The use of water from springs tributary to Alder Gulch for irrigation in 1864 is shown by records. Diversion for irrigation from the East Gallatin River and from Last Chance Creek near Helena in 1865 are also recorded.

First National Irrigation Congress.

A period of drouth due to scanty rainfall will naturally stimulate interest in irrigation. The years 1889 and 1890 had a very low precipitation and awakened interest in irrigation development on a large scale. As a result of this interest an Irrigation Congress met in Salt Lake City in 1891 and passed several resolutions, some of them urging Congress to grant parts of the irrigable public lands to the states and also requesting that a portion of the revenues from public lands be expended in reclaiming them.

First Montana Irrigation Meeting.

Following the Salt Lake City meeting a Montana State Irrigation Convention was held in Helena, January 7, 8 and 9, 1892, composed of delegates called by the Governor from the different counties. This convention passed resolutions similar to those of the Salt Lake City Congress, and also included one urging a congressional appropriation for the purpose of sinking wells to test the artesian water supply possibilities. Numerous interesting discussions were recorded in the report of that meeting. The following is a quotation from the speech of W. A. Clark of Silver Bow County in the session of January 8, 1892: "* * * Now what is the status of irrigation here today? Almost at a standstill. * * * Individual effort has almost reached its limit and it becomes necessary to invoke the assistance of capital or depend on Government or State appropriations. Hence, we are confronted with the important problem as to how we can best effect the reclamation of these lands and provide homes for the people."

The Carey Act.

On August 18, 1894, the Federal Carey Act was approved. This authorized grants of lands to the states upon condition that arrangements be made for their reclamation, settlement and cultivation. In an Act approved March 18, 1895, the Montana Legislature attempted to take advantage of the Carey Act. This legislation proved unsatisfactory, and a more elaborate law creating the State Arid Land Grant Commission was enacted and approved March 8, 1897. This commission attempted to reclaim the lands selected under the provisions of the Carey Act and colonize them. Construction by the State proved unsatisfactory, and in 1903 a law was passed abolishing the Arid Land Grant Commission and creating the Carey Land Act Board. This law was modified in 1905, leaving it practically the same as it is today.

Under the present Carey Act laws, persons or corporations who desire to reclaim lands of the public domain apply to the Carey Land Act Board, asking it to select the desired land under the Carey Act. If the State officials approve the proposed project they apply to the United States requesting that the land in question be segregated or set aside from the public domain and withdrawn from homestead entry. After various requirements, including the reclamation of the land, are satisfactorily complied with, the State receives a patent to the land from the United States. The State in turn issues patents to individual settlers who establish residence on and cultivate the land and buy their water rights for their farms from the builders of the irrigation works. Approval and supervision of the projects by competent State officials assures an ample water supply and a substantial irrigation system. The Carey Land Act Board is composed of the Governor, Attorney General, and Secretary of State. The State Engineer is its official secretary.



Along One of Montana's Rivers.

Billings Project.

The first project initiated was arid land grant district No. 1, later known as the Billings Carey project, irrigating lands between Billings and Shepherd on what is called the Billings Bench. Its first lands were segregated or withdrawn from public entry on December 3, 1897. Little was done in actual work until after the Carey Land Act Board was created and had supervision. The project was built at a cost of over half a million dollars, covering about 23,000 irrigable acres.

In 1920 the Carey Land Act Board relinquished all control over the irrigation system to the Billings Bench Water Association, which is composed of the water users. During the past few years water has been used on 17,000 acres and assessments of \$2.00 per acre per year have been levied for operation and maintenance. Substantial homes and profitable farming have made this one of the most satisfactory projects in the State.

Valier Project.

The Valier Carey project in Pondera County has sold water stock for nearly 70,000 acres and has actually been irrigating more than 60,000 acres. This is more than any other project in the State has irrigated. While there is more irrigable land under the canals in this project, the total acreage to be irrigated has been limited to 80,000 so as to insure an ample water supply. The construction cost has been over \$4,000,000 and the irrigation works include about 500 miles of canals and numerous structures. The most interesting structure on the project is the Swift dam of rock-fill type, 160 feet high, on Birch Creek, about thirty-four miles west of Valier. In 1924 the total crop value on the Valier project was \$869,170 and the value of improvements and livestock \$1,257,105.



Three Forks of Missouri.

Other Projects.

Other Carey Act projects in Montana are the Big Timber project, in Sweet Grass County, the Flatwillow project, in Petroleum County, and the Little Missouri project, in Carter County. The five existing projects embrace a total irrigable area of over 150,000 acres. The three projects constructed are actually irrigating over 80,000 acres of their total of about 120,000 irrigable acres.

At different times other Carey projects have been proposed and public lands temporarily withdrawn from entry, but for various reasons they have been relinquished. The last relinquishment was of the lands of the Teton project, near Brady. The original plan was to include all the irrigable land of a tract of about 160,000 acres, and a Carey Act segregation of 55,393 acres was withdrawn from entry in 1911. Plans were based on an insufficient record of stream flow, but about half a million dollars was spent on diversion works, canal and storage dam before it was realized that the water supply was less than supposed. In 1925 the remaining Carey lands of this project were relinquished and the water rights and constructed works of the Carey Act Company purchased by the Bynum Irrigation District.

Federal Reclamation.

Following the earlier Carey Act developments, and contemporaneously with the later ones, the United States began the construction and settlement of irrigation projects. The Reclamation Act was passed in 1902 allowing proceeds from the sale of public lands to be used in the construction of Federal projects, the cost of construction to be repaid by the settlers without interest. Reconnaissance and preliminary surveys were begun in 1902 for the Milk River project, in 1903 for the Lower Yellowstone project, 1904 for the Huntley project, in 1905 for the Sun River project, in 1907 for the Flathead and Blackfoot Indian projects, and in 1908 for the Fort Peck Indian project.

Lands were open for settlement as early as 1907 on the Huntley and 1908 on the Sun River and Lower Yellowstone projects. The Huntley project in Yellowstone County lies just across the Yellowstone River from the Billings Carey project, and is one of the most successful of Federal projects in the Rocky Mountain region. Water was available for 32,540 acres in 1924 and 19,600 acres were actually irrigated. It happens that over 12,000 acres of this project are considered temporarily unproductive because of the quality of the soil, so practically all the good irrigable land was in production that year.



St. Mary's Crossing Pressure Pipe.



Lateral on Sun River Irrigation Project.

Other Federal projects are the Milk River project, which was able to irrigate 107,800 acres in 1924, the Sun River project, able to supply water to 57,160 acres in 1924, and the Lower Yellowstone project, which was able to supply water to 58,000 acres in 1924. The lower end of this project extends into North Dakota.

The four federal projects which have been mentioned were constructed by the United States Reclamation Service, which, in 1923, was succeeded by the Bureau of Reclamation. The Reclamation Service also constructed three Indian projects; the Flathead, the Blackfeet and the Fort Peck projects. These are now under the control of and are operated by the engineers of the Office of Indian Affairs.

Indian Projects.

The Flathead project in Lake and Sanders Counties contemplates irrigating about 125,000 acres. They were able to supply water to 106,920 acres in 1922. The Blackfeet project in Glacier and Pondera Counties has an estimated irrigable area of 107,500 acres, of which 20,900 were under constructed ditches in 1922. The Fort Peck project in Sheridan, Valley and Roosevelt Counties has an irrigable area of 153,394 acres, of which 22,795 acres were under ditch in 1922. Both the Fort Peck and Blackfeet projects have large areas of Indian land which have not been completely utilized.

The total construction costs expended by the Reclamation Service to June 30, 1923, on the three Indian projects were: Blackfeet, \$1,176,842.91; Flathead, \$4,803,406.38; and Fort Peck, \$886,665.81.

Irrigation Districts.

With the settlement of the public domain a need arose for the financing of projects embracing lands owned largely by individuals. The Carey Act was not



Rainbow Falls of the Missouri, Near Great Falls.

applicable and the United States Reclamation Service was devoting its energies largely to development of the public domain and Indian projects. In 1887 the California Legislature passed its first irrigation district law. In the following year a number of other states followed, and in 1907 Montana's first irrigation district law was passed. It was amended by Chapter 146 of the Laws of 1909 to the form which, with numerous amendments, is still in effect.

The irrigation district is a public corporation organized under the jurisdiction of the District Court. It may issue bonds for the purchase or construction of works. The assessments for operation and maintenance as well as the bond interest and sinking funds are collected by county officials at the same time county and state taxes are collected.

Sixty Districts.

Creation of districts proceeded at a rate of about two per year until the dry year of 1919, when thirteen were organized, and 1920, when twenty-three were created. In 1921 five districts were formed, but since then there have been comparatively few attempts to form districts. Sixty existing districts have an estimated irrigable area of 845,000 acres. Four have been abandoned or dissolved without issuing bonds. Thirty-seven districts have sold bonds amounting to \$5,872,000. Of these, four districts have issued bonds for refunding warrants but have done no construction work. Seven districts have been operating without issu-

ing bonds. Thus there are 40 operating districts. These have a total estimated irrigable area of 374,500 acres.

Public Service Commission Districts.

In 1919 and 1921 new laws were passed permitting the organization of districts under supervision of the Montana Public Service Commission. A number of districts have been investigated and bonds have been sold on three of them, including the Red Lodge-Rosebud, the Upper Glendive-Fallon, and the Trout Creek Basin irrigation districts.

The Red-Lodge-Rosebud district, in Carbon County, has 11,060 irrigable acres. A bond issue of \$418,000 authorized in 1922 was sold and the system is nearly completed.

The Upper Glendive-Fallon district, in Dawson County, has sold a \$150,000 bond issue which was authorized in 1922; 4,210 acres are to be irrigated by pumping from the Yellowstone River. A 40-foot lift has been constructed and the first unit of 1,190 acres is being successfully farmed.

The Trout Creek Basin district, in Granite County, was created in 1924. It has disposed of \$35,000 worth of bonds, the proceeds of which will be used to enlarge a constructed system to irrigate 1,796 acres.

Irrigation District Bond Commission.

In 1921 and in subsequent years amendments to Chapter 146 of the Laws of 1909 were passed. These make the law similar to the amended laws of California, Oregon and other states where they have proven of great assistance to districts. These amendments affect the organization and the sale of bonds of districts. No district organized under these laws shall be created by the Court without an opinion of the State Engineer on water supply and engineering features. No such district may issue bonds without approval of the Irrigation District Bond Commission, which is composed of the Attorney General, Superintendent of Banks, and the State Engineer.

A number of districts have been investigated by the Irrigation District Bond Commission and four issues approved and sold, including those of the Cove, Bitter Root, Bynum, and Harlem irrigation districts.

The Cove district, in Sweet Grass and Yellowstone Counties, contains 5,700 irrigable acres. It includes highly improved farms which had been irrigated for fifteen years from the Cove ditch, which diverts from the Yellowstone River. The proceeds of a \$300,000 bond issue authorized in 1922 were spent in enlarging and improving the canal.

The Bitter Root district, in Ravalli County, contains 19,200 irrigable acres on the east side of the Bitter Root River. An old system was purchased and partly reconstructed and repaired with the proceeds of a \$600,000 bond issue sold in 1924. A marked increase in the acreage irrigated is highly pleasing to those interested in the district.

The Bynum district, in Teton County, sold a \$1,000,000 bond issue in 1925 for the purchase of constructed diversion and storage works and for the construction of a distribution system to cover 21,000 irrigable acres. A colonization company has been organized and is placing settlers on lands of the district and giving them financial assistance.

The Harlem district bond issue of \$30,000 was approved in 1926. It was issued for the financing of a pumping plant to supply 11,500 acres of improved land which have been under irrigation for 30 years. Arrangements have been made to sell these bonds locally at par.

Value of Such a Commission.

The impartial advice of a commission composed of experts along the three lines which cover the vital problems connected with a district is of great help to both district and bond buyer. The State Engineer is an experienced hydraulic and irrigation engineer, the Attorney General reviews the legal matters which are of especial importance when bonds are to be issued, and the Superintendent of Banks is by training and experience qualified to pass on economic features which are as important as any other matter when bond issues are involved.

Pumping for Irrigation.

Of increasing importance is the development of irrigated tracts by pumping the water to lands which it would be impossible or more expensive to reclaim by other methods. The Lockwood irrigation district, in Yellowstone County, has been pumping water to an elevation of 150 feet and irrigating over 2,000 acres. A number of small tracts irrigated by pumping along the Sun River near its mouth are yielding big returns from garden truck.

In the Helena Valley about 10,000 acres are under ditches served by pumping from Lake Helena to a maximum height of 160 feet. The Harlem irrigation district, with 11,543 irrigable acres, is now installing pumps to eliminate an expensive and unsatisfactory diversion dam. The lift in this case is only fourteen feet.

The developments in the above cases have all been constructed with hydro-electric power to run the pumps, although there are other plants using steam power, gasoline power, and water wheels. Many thousands of acres of good land not served by existing systems are adjacent to streams and readily irrigable by pumping against low heads. Developments of this kind have been constructed at costs ranging from \$10 to \$20 per acre. It is believed that an appreciable increase in irrigated area will materialize from future development of pumping projects.

Big Returns From Irrigation.

One cannot spend much time in conscientious observation and study of existing irrigated farms without becoming enthusiastic over their possibilities. The Yellowstone, Bitter Root and other valleys afford numerous instances of crop returns being over \$100 per acre on fairly large fields of beets, beans, peas, and orchards, while garden truck and potatoes may go higher. Some of the idle land in the Bitter Root irrigation district was purchased by payment of the delinquent taxes in 1925, and yielded over \$100 per acre from the pea crop raised that year. This is a district which in 1924 repaired its system and in that year 11,783 acres were farmed. In 1925, 12,741 acres were farmed, and the increase in 1926 is expected to be 1,500 acres. It is believed that all the vacant lands in this district will be settled in two or three years.

The Yellowstone, Clark Fork and Milk River Valleys and other localities are raising sugar beets most successfully. As an illustration of their value, one 40 acre tract in the Yellowstone Valley was noted which in a three-year period returned a gross income of \$15,000. Yields of alfalfa of six tons per acre can be obtained.

Irrigation Increases Production.

As an illustration of comparative productivity the following figures from the United States Bureau of Crop Estimates for 1925 are of interest. The crops reported gave 10.9 bushels of spring wheat per acre on non-irrigated and 26.2 bushels on irrigated land; 21.7 bushels of oats per acre were raised on non-irrigated and 49.1 bushels on irrigated land; 74.3 bushels of potatoes were reported from non-irrigated and 163 bushels per acre from irrigated land. The reports showed 17 bushels of corn per acre from non-irrigated and 32.8 bushels per acre from irrigated land. Individual illustrations may be given of numerous higher yields than the averages quoted above.

Irrigation Increases Land Values.

Figures on assessed values will show the importance to the community of irrigated land. These may be found in the annual reports of the State Board of Equalization. In 1925, 1,468,200 irrigated acres were assessed at an average of \$50.95 per acre or \$74,810,755, while 19,382,223 acres of non-irrigated tillable lands were assessed at \$13.44 or \$260,476,234. The average tax levied per acre was 21 cents for non-irrigated tillable land and 80 cents for irrigated land.

Opportunities for Homeseekers.

Montana has probably a total of 2,000,000 acres now irrigated, with works contemplated for nearly an additional 1,000,000 acres. There are probably 200,000 acres of irrigable land not being farmed. Various estimates of the total area that can be irrigated run from 5,000,000 to 7,000,000 acres. There are numerous beautiful valleys where farms may be secured that will be profitable and highly satisfactory to the right class of settlers. Mills, creameries, cheese factories, canneries, apple packing plants, sugar factories and marketing associations all contribute to the prosperity of farmers on Montana's irrigated lands. Her apples go to New York and her butter to California, her seed potatoes to the south and her seed peas

to Wisconsin. Arrangements have been made to finance settlers on certain of the irrigated projects in the purchase of sheep and dairy cattle which have recently been paying large dividends. Easier terms of repayment on Federal projects and irrigation districts combined with a delightful climate, fertile soil and developed markets make Montana a land of promise to prospective settlers desiring irrigated land.



Chessman Reservoir near Rimini.

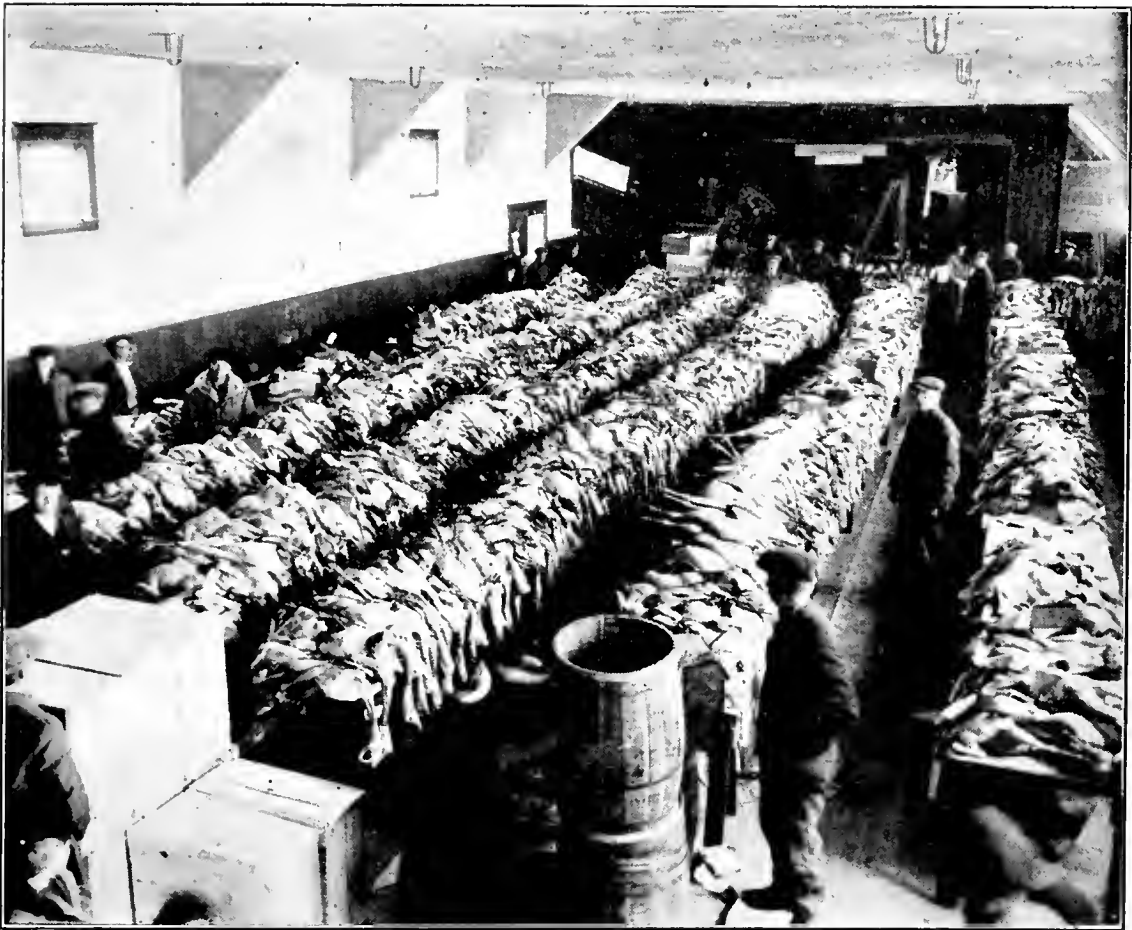
MONTANA'S POULTRY



Turkey Raising Now a Half Million Dollar Industry—Pondera County Leads in Cooperative Pools—State Poultry Shows.



By H. E. Cushman.



Twenty-five Tons of Turkeys in Pool Shipment at Chinook, 1925.

Montana's poultry industry is on a firm basis. While we do not have a great many large commercial flocks of chickens and are not an egg exporting state in the sense of the word that the Pacific Coast states are, we have a great many farm flocks composed of birds well above the average in quality. From these flocks we, as a state, are able to produce enough eggs for our own consumption.

As an egg consuming state Montana ranks first in the Union. Her people realize the nutritive value of eggs and consume on an average 44.2 dozen per capita yearly.

The hens that supply this vast number of eggs are scattered out over our fertile valleys, through the irrigated sections, and even on to the most remote non-irrigated homestead.

Quite characteristically the average Montana breeder, even though situated way off on a non-irrigated farm, is not satisfied with just hens. As soon as finances permit, he begins breeding-up some standard variety of bird. While almost any variety can be found if one looks long enough, the majority of people realize that standardization of varieties is also advisable. Thus most of the poultry population falls into one of the following breeds: S. C. White Leghorns, Barred Plymouth Rocks, White Plymouth Rocks, S. C. and R. C. Rhode Island Reds, White Wyandottes, and Buff Orpingtons.

And in these classes we find members of outstanding American strains; for example, many fine Tancered flocks of Leghorns are reared in the State, several well-bred flocks of Martin's Regal Dorcas White Wyandottes, and so on.

It is fortunate, indeed, that the breeders have been far-sighted enough to go into these good breeds of poultry, for therein lies a great future for Montana. Nowhere in the world can better breeding stock be produced. The pure air, high altitudes, and the quick growing season all contribute to the building of husky breeding stock. It gives birds that have sturdy bones and rich color. Repeatedly Montanans have entered birds in big shows as the Chicago Coliseum, for instance, and have taken off their share of the prizes. Montana took a whole earload to the Panama Pacific Exposition and made a big killing. The judges all like the vigor of the Montana birds and have to reward the rich coloring which can only be obtained where birds are grown in northerly high altitudes.

But having beautiful show birds is by far the least that Montana poultrymen are accomplishing. They are making money from their hens as egg machines. A great number of producers send monthly records to the State College. These reports contain very accurate data of all receipts and expenses. No farmer that has made any effort at all has netted less than \$2 per bird per year.

One man, Clark Bumgarner of Fife, netted \$5.59 per bird. Mr. Bumgarner is not a commercial poultryman. Rather he is a regular farmer, running a diversified farm, dairy, wheat, and other crops. What he has done others can do and are doing. He gave the birds the benefit of good housing, good feed, and



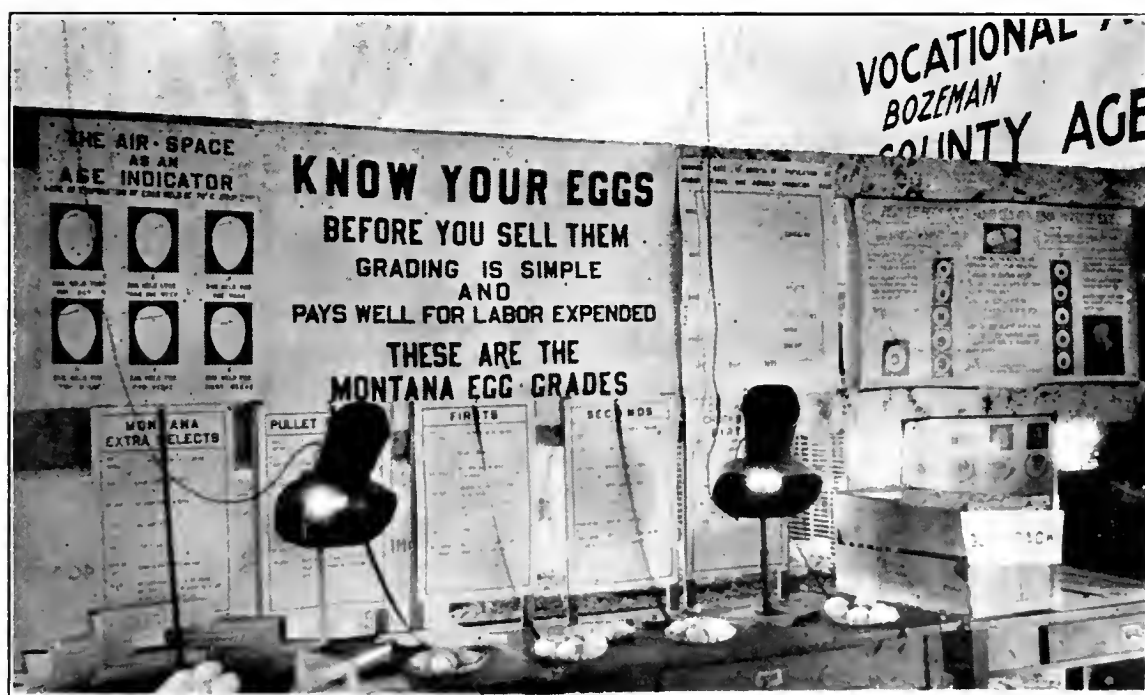
Turkeys on Central Montana Farm.

good breeding. He yearly buys day-old chicks from J. R. Scott, one of our Montana breeders who conducts a very careful pedigreed plant near Helena. Mr. Bumgarner got his chicks early enough in the spring, during the month of April, so that they were able to come into production by the latter part of October. In this way he was able to reap the benefits of a high market. There are not many places in the United States that a man could net \$5.59 a bird from eggs alone, even with careful management.

Speaking of the price of eggs in Montana, it is true that in some sections the price falls to a disgustingly low point during the late spring and early summer. But taking the State as a whole, Montanas average egg prices compare very favorably with those of other states in the Union. Then taking into consideration the lower price of feed and the fact that practically all the food consumed by poultry can be raised locally, the Montana poultrymen have as good a chance to make a neat profit as any other poultrymen.

Up to this point I have spoken only of the domesticated chicken. To really cover the poultry situation in Montana, one must give due space to the turkey. As far as the turkey industry in Montana is concerned we need not take a back seat for anyone. Montana is a real turkey state. Although the present expansion of the industry is only about four years old, it has already assumed the proportions of over a \$500,000 industry.

Four years ago Pondera County started a cooperative pool. About a carload of birds were shipped. The quality of the birds and the way they were packed was nothing to brag of. Yet the receipts from that shipment so encouraged the turkey raisers of that county that they began perfecting a permanent organization. Last year they shipped five cars on the Christmas market alone. Moreover the quality of the birds has so improved and the association is putting up the product in so much better shape that they were not only able to sell the birds to the terminal produce house directly and on the grade of their manager, but were also able to get a special bid on young toms 14 pounds and over. By this classification of young toms the association made an extra \$1,315.79 on their Christmas shipment.



An Egg Grading Demonstration, Gallatin County Fair, 1925.

Other counties in the State have not been slow in following Pondera's example. We now have 11 counties with cooperative turkey marketing organizations that are pooling their turkeys and selling in car lot shipments to the highest bidder. Not counting the individual express shipments (and there were many) there were 50 cars or around 1,200,000 pounds of turkeys at an average of 40 cents per pound sold from pools during the 1925 holiday season.

The turkey raisers are not satisfied with merely plump birds that attain size at Christmas time, nor do they think they have reached their goal when they have learned how to kill and dress birds so that they will make a No. 1 grade. The Montana raisers want the best. And at present the list of standard-bred bronze turkeys is long. The turkey section of the State Show held at Conrad, Montana, January, 1926, would do great credit to any state. The judges said the show with its 116 turkeys surpassed all general shows to date in both number and quality. Only the All American Turkey Show held at Fargo, North Dakota, could boast of a greater number of turkeys.

The week following the Montana State Show the Montana breeders showed the world they have quality as well as quantity, for birds were taken out of the Conrad Show, entered at Fargo, and won over birds from all parts of the United States and Canada. Mrs. Lillian German from Lohman, Montana, not only won cups but her birds scored 1,103 points, 600 points being the nearest score to hers. Further, no turkeys at the All American ever scored more than 1,100 before.

As to the future of the poultry industry as a whole, in Montana we have no misgivings. It will go ahead as it always has. Because of climatic conditions, Montana's poultry will always stand with the best. Because of far-sighted poultrymen, the producers will gradually all band themselves into a cooperative marketing association which will always receive the top market price for quality grade produced.

RESULTS OF 1925 EGG PRODUCTION

	No. of Farms	No. of Hens and Pullets in Flock*	No. Eggs Produced	Per Cent of Whole Flock Producing
January	495	27,105	3,110	11.5
April	282	18,243	7,283	11.5
May	333	23,569	13,090	58.0
June	271	16,405	8,875	53.7
July	276	16,480	7,532	45.7
August	300	16,036	6,248	38.9
September	262	11,645	4,532	38.9
October	278	15,710	4,709	29.9
November	262	14,580	1,956	13.4
December	311	19,348	1,865	9.6
Average 10 Months	307.0	17,812.1	5,920.0	33.2

*Number of hens and pullets in flock of laying age on last day of month preceding.

MONTANA'S RANK WITH OTHER STATES IN CROP PRODUCTION

CROP	Rank		CROP	Rank	
	1925	1924		1925	1924
Corn	31	31	Potatoes	24	29
Spring Wheat	2	2	Flax	4	4
Winter Wheat	23	14	Apples	43	42
All Wheat	4	4	Tame Hay	17	16
Oats	16	16	Wild Hay	6	6
Barley	14	16	Beans	6	7
Rye	9	10	All Crops	30	28

NUMBER OF FARMS IN MONTANA BY COUNTIES
(Census of 1925-1920-1910)

DISTRICT & COUNTY	Census of 1925	Census of 1920	Census of 1910
NORTHWESTERN			
Flathead	1,238	1,923	1,189
Lincoln	583	341	298
Lake	964*	.....	.....
Sanders	669	667	211
NORTH CENTRAL			
Blaine	1,135	1,761	.....
Chouteau	1,649	2,573	1,818
Glacier	345	372	.....
Hill	1,421	2,257	.....
Liberty	446	515	.....
Pondera	792	1,060	.....
Teton	1,089	1,135	1,187
Toole	597	933	.....
NORTHEASTERN			
Daniels	1,020*	.....	.....
Phillips	1,427	1,914	.....
Roosevelt	1,267	1,215	.....
Sheridan	1,487	2,408	.....
Valley	1,925	2,169	1,946
WEST CENTRAL			
Deer Lodge	93	202	171
Granite	227	354	295
Mineral	103	95	.....
Missoula	673	1,323	670
Powell	360	476	377
Ravalli	1,039	1,231	1,055
CENTRAL			
Broadwater	321	466	390
Cascade	1,257	1,703	1,502
Fergus	1,918	4,226	2,310
Golden Valley	492*	.....	.....
Jefferson	446	555	301
Judith Basin	783	.....	.....
Lewis & Clark	543	855	529
Meagher	310	447	400
Musselshell	650	1,604	.....
Wheatland	386	688	.....
EAST CENTRAL			
Dawson	1,105	1,195	1,947
Garfield	1,312	1,530	.....
McCone	1,072	1,284	.....
Prairie	560	673	.....
Richalnd	1,429	1,577	.....
Wibaux	466	530	.....
SOUTHWESTERN			
Beaverhead	790	642	536
Madison	715	901	730
Silver Bow	180	331	230
SOUTH CENTRAL			
Carbon	1,095	1,353	1,264
Gallatin	1,026	1,349	1,260
Park	619	756	730
Stillwater	946	1,370	.....
Sweet Grass	632	863	473
Yellowstone	1,960	2,211	1,812
SOUTHEASTERN			
Big Horn	1,250	791	.....
Carter	770	855	.....
Custer	716	941	1,622
Fallon	659	758	.....
Powder River	838	833	.....
Rosebud	792	1,136	961
Treasure	299	330	.....
STATE TOTALS	46,896	57,677	26,214

* Counties formed after census of 1920 was taken.

COUNTY	ALL CATTLE	CALVES		HEIFERS		COWS & HEIFERS		STEERS	BULLS	
		Under 1 Yr. Dairy	Beef	1 Yr. and Under Dairy	Beef	2 Yrs. and Over Dairy	Beef		1 Yr. and Over Dairy	Beef
Beaverhead	95,147	349	21,319	134	11,175	1,041	40,140	19,447	32	1,510
Big Horn	36,639	1,037	8,159	514	3,756	2,355	12,469	7,762	73	514
Blaine	29,294	937	7,110	437	2,986	3,428	9,492	4,428	264	364
Broadwater	14,283	320	3,325	143	1,571	1,062	5,923	1,603	31	305
Carbon	20,515	1,818	4,077	664	1,483	3,585	6,742	1,744	86	316
Carter	34,632	451	8,983	192	4,304	873	12,432	6,924	22	451
Cascade	46,243	1,443	11,708	850	4,131	4,273	17,508	5,541	127	662
Chouteau	37,590	938	10,231	390	3,335	3,745	12,128	5,376	70	1,177
Custer	32,328	572	8,177	217	3,771	1,598	12,171	5,417	26	379
Daniels	14,388	360	3,968	172	1,592	1,830	4,505	1,737	30	194
Dawson	31,596	299	8,664	184	3,398	871	11,614	6,083	25	458
Deer Lodge	4,007	141	882	49	373	476	1,497	496	18	75
Fallon	17,602	302	4,762	108	2,303	620	6,584	2,635	29	259
Fergus	49,790	806	14,279	348	5,576	1,521	20,298	6,081	70	811
Flathead	1,145	744	2,310	141	1,936	3,303	3,981	1,178	95	282
Gallatin	31,009	1,966	3,616	963	5,608	4,726	9,984	3,644	160	342
Garfield	36,210	539	10,903	87	4,019	554	14,197	5,302	10	599
Glacier	23,553	.....	4,865	.....	2,577	149	8,503	7,062	.....	397
Golden Valley	177	.....	3,408	47	1,224	313	4,518	965	.....	177
Granite	10,851	471	3,309	141	1,451	1,064	6,140	1,458	33	210
Hill	14,277	844	4,781	454	1,936	3,515	5,737	2,224	78	272
Jefferson	19,841	647	2,939	434	1,556	2,265	5,995	1,623	76	205
Judith Basin	15,740	584	7,827	224	3,080	1,122	11,375	4,411	37	424
Lake	23,457	1,905	1,634	1,118	886	4,303	2,419	939	155	98
Lewis & Clark	31,093	552	6,951	318	3,061	1,963	11,326	6,402	63	447
Liberty	9,417	178	2,522	72	1,087	899	2,753	1,807	3	96
Lincoln	5,242	296	865	1,061	393	910	1,359	277	30	51
McCone	27,011	10	7,697	15	3,100	358	10,430	5,052	2	347
Madison	32,890	510	8,202	267	3,696	1,516	13,948	4,139	54	558
Meagher	23,421	545	6,163	280	2,118	1,227	8,365	4,274	27	422
Mineral	1,069	108	193	70	81	273	272	45	13	14
Missoula	11,521	622	2,095	415	928	2,233	3,794	1,218	52	164
Musselshell	19,177	308	5,116	162	2,015	739	7,622	2,843	62	310
Park	24,634	809	5,857	322	2,608	2,010	10,089	2,508	42	389
Phillips	31,583	533	8,925	230	3,439	3,489	10,285	4,039	54	589
Pondera	16,672	946	3,833	405	1,984	2,853	4,236	2,116	82	217
Powder River	48,262	179	13,275	104	5,735	421	20,587	7,252	19	690
Powell	20,984	531	4,473	321	1,866	1,475	8,451	3,433	56	378
Prairie	18,610	371	5,215	137	1,830	601	7,141	3,032	19	264
Ravalli	19,645	2,893	2,133	1,430	1,004	6,839	3,271	1,663	284	128
Richland	22,804	905	5,335	833	2,273	2,285	7,807	2,816	83	467
Roosevelt	38,670	320	6,100	194	3,735	777	23,267	3,897	34	346
Rosebud	34,027	391	10,038	147	3,804	950	13,939	4,219	30	509
Sanders	11,160	1,162	1,706	499	1,054	2,345	2,845	1,327	84	138
Sheridan	22,897	1,470	5,443	686	2,300	2,795	7,453	2,322	124	304
Silver Bow	4,930	330	694	237	351	1,663	1,169	381	60	45
Stillwater	21,179	926	5,514	504	2,378	1,739	7,468	2,178	69	403
Sweet Grass	25,625	767	6,118	341	2,850	1,496	8,743	4,872	46	392
Teton	27,364	1,149	3,262	585	2,291	2,785	8,933	5,068	55	354
Toole	12,176	170	3,262	93	1,340	1,875	3,751	1,488	22	175
Treasure	10,279	25	2,929	11	1,229	71	4,239	1,644	3	128
Valley	34,255	388	10,437	208	4,013	969	13,362	4,320	37	521
Wheatland	20,687	857	4,874	116	2,160	1,491	6,505	4,418	41	225
Wibaux	9,594	400	2,242	187	1,046	849	3,301	1,381	43	145
Yellowstone	30,783	2,181	6,825	1,237	2,183	5,856	8,601	3,271	262	367
STATE TOTAL	1,339,847	38,883	322,412	20,101	141,315	104,344	491,674	197,630	3,424	20,064

LIVESTOCK AND LIVESTOCK PRODUCTS



The Value of Livestock on Farms Increased Over \$4,000,000 in 1925.



By J. G. Diamond.

Total value of all classes of Montana livestock on farms and ranges in the State on January 1, 1926, was \$94,206,000, or a little better than \$4,000,000 larger than the revised estimate for January 1, 1925.

Net changes during the year ending January 1, 1926, show, according to the official estimates, a decline of 20,000 in horse numbers, no change in numbers of mules and mule colts, a decrease of 60,000 in numbers of all cattle, and an increase of 262,000 in numbers of all sheep and no change in numbers of swine.

In relative valuations, cattle lead the list with a total of \$40,960,000 against \$40,200,000 a year ago and an average value per head of \$32 against \$30 last year. Sheep follow with a total value this year of \$32,342,000 against \$26,822,000 and an average value per head of \$11.40 against \$10.40 last year. Horses and colts this year had a total value of \$16,128,000 against \$19,072,000 a year ago and an average value per head this year of \$28 compared with \$32 last year. Mules and mule colts were valued this year at \$576,000, against \$514,000 last year with an average value per head this year of \$52 and \$47 last year. All swine this year were valued at \$4,200,000 against \$3,360,000 last year and an average value per head this year of \$15 compared to \$12 last year.

Numbers of livestock this year (last year in parenthesis) for the various classes were as follows: Horses and colts, 576,000 (596,000); mules and mule colts, 11,000 (11,000); all cattle, 1,280,000 (1,340,000); all sheep, 2,837,000 (2,579,000); all swine, 280,000 (280,000).

Included in above estimates of all cattle are estimated numbers and values of milk cows and heifers (for milk) two years old and over on January 1, 1926, as follows (1925 comparisons in parenthesis): Number, 192,000 (187,000); value per head, \$54 (\$50); total value, \$10,368,000 (\$9,350,000). Number of heifer calves intended for milk, aged over one year and under two years, was 36,000 this year and 35,000 last year.

The above estimates are based on (1) the data secured by the Federal Census of the fall of 1924; (2) voluntary reports of actual holdings by a large number of stockmen and farmers throughout the State, (3) special sample surveys conducted by the U. S. Department of Agriculture through the rural carriers with the co-operation of the Post Office Department, (4) a careful analysis of railroad shipments and stockyard receipts during the past five years. Revisions of yearly estimates from 1920 to 1924 were made in connection with the estimates for 1925 and 1926.

Horses and Mules.

Horses continue to show a steady downward trend in numbers, due principally to the declining market for Montana horses that followed the war period. Exports have declined steadily from 1920 to 1923 since which time exports of range horses have become largely those to east central market canning factories.

Colt crops have generally decreased to a point where breeding is now mainly for maintenance of farm work stock and there has been a tendency in breed-



On a Montana Farm.

ing to get away from the smaller type of Montana range animal to a heavier type more adaptable for farm work.

The January 1, 1926, number estimated at 576,000 compares with 596,000 head a year ago and the peak number of 1919 which was 720,000 head.

Montana has never produced mules in any great number, the average of the past ten years being well below 10,000 head for the entire state. In recent years there has been a slight increase in breeding and use of mules with the present number being placed at about 11,000.

Beef Cattle.

Following the severe deflation of 1919, the tendency of beef production in Montana has been largely that of maintaining itself, and while there was a continued decrease in straight range cattle to some extent this has been offset by larger holdings of farm cattle. On January 1, 1919, prior to the heavy liquidation of that year when nearly 642,000 head were shipped out, total numbers on farms and ranges of cattle other than milk cows was placed at 1,447,000. A year from that date the number was placed at 1,088,000 head, ranging between 1,138,000 and 1,195,000 in the next four years to 1925. During 1925 another heavy liquidation has taken place. The nature of this liquidation has been largely that of taking advantage of the relatively high prices of 1925 compared with any post-war year.

January 1, 1926, numbers placed at 1,052,000 are now lower than any inventory since 1916, indicating that the beef end of the industry has gone a long way in readjusting itself to the post-war trend of prices.

Since the Montana beef situation is influenced to a large degree by the competition of other states, it is of interest to Montana stockmen to know that in line with the liquidation in Montana cattle other than milk cows, there has been a corresponding decrease in total numbers in the United States as a whole.

The estimates of January 1, 1926, show 33,678,000 cattle other than milk cows in the United States against 35,391,000 a year ago. As indicating the trend of this competition since 1920, all cattle in the United States, including milk cows,



Sugar Beets in Yellowstone Valley.

declined from 68,900,000 head on January 1, 1920, to 59,800,000 head on January 1, 1926, a decrease of about 9,000,000 head. The analysis of this decrease is significant in that it shows a decrease of 2,900,000 in steers; 3,400,000 in calves; 1,100,000 in heifers, and 1,600,000 head in cows. The average annual decrease in this period has been about 1,500,000 head.

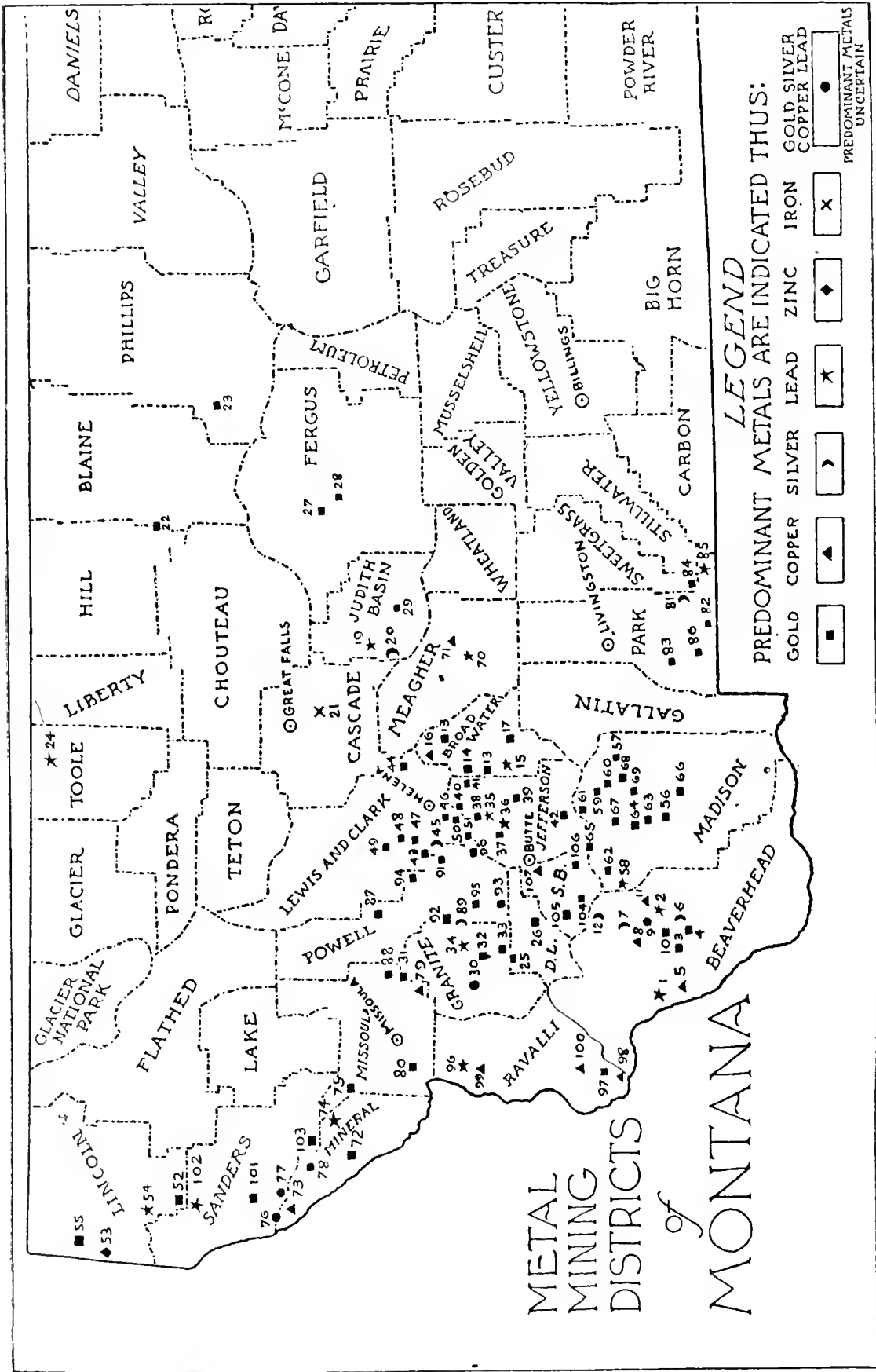
Commenting on this situation, the Agricultural Outlook of the United States Department of Agriculture, while admitting a favorable outlook both in its immediate and long-time aspects, points out the fact that although beef cows have decreased 2,500,000 head, the number of milk cows is about 1,000,000 larger than in 1920, and many of these cows produce beef calves. The present number of breeding animals is furthermore considered as being probably large enough to produce as much beef as it will pay cattle producers to raise.

Montana cattle men in common with those of the rest of the country have seen cattle prices working through a slow cycle reaching comparatively low prices in recent years. Cattle prices are now generally believed to be in the upward swing of that cycle, with the peak still several years in the future.

During the last half of 1926 total market receipts of cattle are expected to fall considerably below those of 1925. In this analysis, marketings of range cattle are expected to be materially less, but the number of grain-finished cattle may be larger. A marked decrease in steers, both grass fat and feeders, is indicated, and calf slaughter in 1926 is expected to be less than in 1925.

While the prices for beef cattle during this period will depend somewhat on the general business situation, the general level is expected to average higher than last year.

Montana cattle men, by careful culling and better care of calf crops, have an opportunity to maintain their quantity of beef of a higher quality without increasing present numbers and with reasonable expectation that such beef should sell at higher prices. By maintaining high grade breeding herds rather than relatively large numbers of steers as in the past, cattle men will be in a position to increase production promptly when prices justify attaining thereby a more flexible production, lower production costs and quicker turnovers.



METAL MINING



State Has Yielded More Than Two Billion Dollars—History and Development Is Interesting.



During the successive periods since its first mineral discovery in 1862, Montana has led all the states in gold, silver, copper or zinc production.

Today she is first in the annual production of manganese, arsenic, and precious stones; is second in the production of copper and silver, fourth in the output of zinc, sixth in lead and seventh in gold.

In gross production her record is even better. The mines of Butte alone have given to the world more copper and more silver than any other district on earth; one-third of all the copper mined in the United States and one-sixth of the world's production of copper to date.

In round figures Montana has yielded more than \$2,000,000,000 in mineral wealth, of which \$1,500,000,000 has been left in the State in the form of wages, freight, and supplies.

This colossal mineral edifice, known as "The Treasure State," reveals a foundation of gold, a ground floor of silver, an upper story of copper and a zinc roof, with composite interior decorations of coal, oil, lead, arsenic, manganese, and sapphires.

When in the spring of 1861 James and Granville Stuart found "colors" in the gravelly bed of Gold Creek and started the stampede that resulted in rich strikes at Bannack, Alder and Last Chance Gulches, they builded better than they knew. In three years Montana was a territory and in 28 years a state.

Montana's placers, from 1862 to 1882, yielded approximately \$200,000,000. Today only a handful of solitary prospectors in remote mountain fastnesses are panning out their \$3 or \$4 a day. The \$500 nuggets turned up by the sourdoughs of 1870 are now almost as scarce as real elk's teeth on a B. P. O. E. watch charm.

Quartz Mining.

Quartz mining, a contemporary of the placers, began with the discovery of the Dacotah Lode near Bannack in November, 1862. Within a few months a mill was set up and put to work, the four stamp stems being made of wood and the shoes and dies of old wagon tires, cut and welded together.

Today most of Montana's gold yield is a by-product of copper, zinc and lead recoveries. In 1915 the State produced its greatest yield, 242,078 ounces, valued at \$5,003,752. It is now producing about 80,000 ounces annually.

Silver.

The era of silver began in 1865, when a rich vein was discovered in the Travana claim, just west of Butte. Silver development began the following year in the Original mine and a small grinding mill was set up, followed in 1867 by a primitive smelter, which used a blacksmith's bellows for a blast. Really successful silver treatment dates from 1875, when William A. Clark built the Dexter 10-stamp mill in Butte.

MINERAL PRODUCTION IN MONTANA FROM 1900 TO 1925, INCLUSIVE*
(U. S. Geological Survey Figures)

Year	Gold	Silver	Copper	Lead	Coal	Zinc	Value of Precious Stones	Manganese	Petroleum	Gas	Rank of State in Val. of Mineral Production	Total** Value
	Fine ozs.	Fine ozs.	Pounds	Short Tons	Tons	Short Tons		Long tons contains 35% or more	Barrels	Cu. Ft.		
1900	227,266	14,195,400	270,738,489	8,022	1,661,775							
1901	229,495	13,131,700	229,870,415	5,791	1,396,081							
1902	211,571	13,243,800	288,903,820	4,438	1,560,823							
1903	213,425	12,642,300	272,555,854	3,303	1,488,810							
1904	206,419	12,817,285	298,314,804	3,635	1,358,919							
1905	231,913	13,231,300	314,750,582	2,207	1,643,832							
1906	216,168	11,980,705	294,701,262	2,485	1,829,921	1,415						\$65,501,049
1907	167,987	11,129,600	224,263,789	2,145	2,016,857	122	\$229,800					74,126,567
1908	152,865	10,356,200	252,503,651	2,320	1,920,190	820	58,397					60,663,511
1909	181,411	12,034,500	314,900,279	1,451	3,756,530	4,680	44,998					46,803,841
1910	179,975	12,282,900	283,078,516	1,943	2,920,970	15,819	57,923					57,492,806
1911	179,499	11,985,196	271,816,098	2,484	2,976,358	21,905	221,613				9	54,388,119
1912	175,371	12,731,638	308,794,482	2,517	3,048,495	13,459	200,585				7	53,498,194
1913	168,994	13,819,201	285,724,467	3,256	3,240,973	44,337	244,935				10	71,620,873
1914	199,203	12,536,700	236,805,845	4,386	2,805,173	55,790	67,452				9	69,307,056
1915	212,077	14,423,173	268,263,040	4,853	2,789,755	93,573	105,355				8	54,244,889
1916	220,130	16,494,366	352,139,768	4,961	3,632,527	114,630	108,263	6,418	44,917		7	89,147,138
1917	170,147	13,128,142	276,225,977	5,933	4,226,689	93,130	59,130	61,109	99,399	334,421	10	142,650,179
1918	158,704	16,378,263	326,426,761	18,568	4,532,505	104,624	47,753	199,932	69,323	177,039	11	123,733,415
1919	119,085	12,541,181	169,981,288	17,219	3,236,000	84,382	48,391	24,993	89,000	858,000,000		139,331,507
1920	91,862	12,579,178	177,059,260	15,627	4,413,866	92,169	223,196	76,441	336,000	817,733,000		73,630,824
1921	71,632	6,558,713	48,098,730	10,183	2,733,968	11,638	489,621	11,129	1,509,000	336,000		85,885,503
1922	80,145	12,468,151	165,754,442	14,883	†	59,534	†	9,751	2,369,000	†		30,161,734
1923	85,079	13,280,862	224,125,264	17,973		70,730		21,916	\$58,487,479	Value is for metals as listed by U. S. G. S.		\$59,871,000
1924	97,854	13,289,303	249,152,062	19,738		64,238		35,445	56,014,467			
†1925	87,407	13,507,900	269,520,400	20,996		51,250			60,802,100			

*See table on page 136 for Mineral Production of Montana from 1862 to 1899, inclusive.

**The total production from metal mines in 1925 is estimated at \$66,000,000.

†Montana State Board of Equalization.

‡Preliminary estimate by U. S. G. S.

Silver smelters were also built and operated at Wickes and Gregory, in Jefferson County. From here silver-lead bullion was hauled in freight wagons to the Union Pacific Railroad at Corinne, Utah. The Wickes plant was succeeded by the present works at East Helena, owned by the American Smelting & Refining Company, which treats the larger part of all silver-lead ores mined in Montana.

Montana has produced more than \$350,000,000 worth of silver, the largest output being that of 1918, which amounted to \$16,797,479.

Copper.

The third, or copper, period in Montana's mineral history began in 1880, when Marcus Daly, backed by Haggin, Hearst and Tevis, deepened the Anaconda mine at Butte from the 60-foot level to a little more than 100 feet and found, to the consternation of everybody but himself, that instead of silver he had struck copper.

In sharp contrast to the gloom of the old-timers and the pessimism of his partners, Daly was cheerful and optimistic. He contended stubbornly that the hill was rich in copper and urged the purchase of neighboring properties. He insisted that he was going to mine and ship enough high-grade ore to Swansea, Wales, to secure the money necessary to build a huge smelter, capable of treating the enormous deposit of copper ore which he claimed was hidden beneath the rugged contour of Butte Hill.

Every mining engineer west of the Mississippi was skeptical. Half the people of Butte called him a visionary. Some thought he was crazy. Daly persisted. He bought up or leased many other properties, started operations on a big scale, and made Butte the greatest mining camp on earth.

Today three monuments vindicate Daly's vision and faith. One stands opposite the Federal building in Butte. It is a bronze replica of his face and figure, and one of the last masterpieces of August St. Gaudens. Another is the huge Anaconda Reduction Works, the largest non-ferrous smelter in the world, which, incidentally, boasts the world's largest smoke stack, nearly 600 feet high. The third is the Anaconda Copper Mining Company, the largest copper mining, smelting, refining and fabricating organization in the world, with 40,000 stockholders and properties in a dozen states and several foreign countries.

Discovery of Gold.

The real development of Montana began with the discovery of gold in commercial quantities. In 1852 a half-breed named Benetsee, who had lived in California, discovered gold on Gold Creek in what is now Powell County. Six years later the Stuart brothers verified the discovery, and in 1861 began mining there. About this time gold in paying quantities was found on the Salmon River and its tributaries in Idaho and an immigration from Colorado to the Salmon set in, many of the seekers passing through Montana and prospecting en route.

August 16, 1862, John White and others discovered gold on Grasshopper Creek near the old town of Bannack, now in Beaverhead County. Other rich bars were found in the district and mining began in earnest and by January of the following year the town had a population of 500 souls. The fame of the diggings spread throughout the West and gold hunters poured in.

Alder Gulch, Madison County, where Virginia City was built, was discovered in the summer of 1863 by William Fairweather's party while returning to Bannack from the Big Horn Mountains in eastern Montana, having been driven out of the region by the Crows. The next important discovery was Last Chance Gulch, where Helena now stands, in the fall of 1864, by John Cowan.

During the next decade in Montana about 500 gold-bearing gulches, varying from half a mile to 20 miles in length, were discovered. The gold production of the territory from 1862 to 1876, inclusive, is estimated at \$144,400,000. The first quartz lode in Montana was the Decotah lode, located near Bannack, November 2, 1862.

Although at the present time Arizona and Utah, with their low cost porphyries, are outstripping Butte in annual copper production, she still retains first place as the nation's largest producer to date. In the 40 years since operations were started, Butte has produced 8,900,000,000 pounds of blister copper, or 27 per cent of the nation's total output. Her present annual production is about 270,000,000 pounds, or approximately 14 per cent of the copper production of the United States.

Zinc.

Within the last 10 years Montana initiated and brought to rapid development the fourth stage in her mineral history—that of zinc. Butte Hill was long known to contain important deposits of zinc ores. But they were so refractory as to be regarded more of a liability than an asset. For years the metallurgists of the Anaconda Company wrestled with the problems of reduction, until finally, in 1916, an electrolytic process was devised whereby the ores could not only be reduced on a satisfactory commercial basis but the resultant grade zinc is today the purest known to commerce—99.9 per cent pure.

It is significant that before this process was evolved, thereby saving to Butte an imperiled industry, years of ceaseless effort and \$7,000,000 in cash were expended before the company realized a penny of profit. Courage and enterprise are today being rewarded. Montana's present production of electrolytic zinc is 160,000,000 pounds a year, of which about three-fourths is from Montana ores.

Manganese.

According to the United States Geological Survey, Montana contains the nation's "greatest, best developed and most available domestic reserves of high



Face of Drift Underground, in a Montana Mine.

grade manganese ore," whose importance came to light during the World War. Requirements of eastern steel-makers for ferro-manganese created the demand. The Butte and Philipsburg districts of Montana afforded the supply.

Estimates made in 1918 showed that Phillipsburg contained about 500,000 tons of manganese ore reserves, with nearly as much in sight at Butte. During the four years, 1916-1919, these districts produced close to 300,000 gross tons of manganese ore, thus contributing heavily to the successful manufacture of manganese steel, a prime war necessity. At the present time, chiefly due to available low-priced ore from foreign lands, less domestic manganese is being mined than during the war. However, Montana leads the nation with annual shipments, exceeding 50,000 tons.

Arsenic.

The need of white arsenic in large quantities with which to fight the boll weevil blight on southern cotton plantations has stimulated Montana's present day output. About 220 carloads, constituting practically one-half of the national output, are shipped from this State each year.

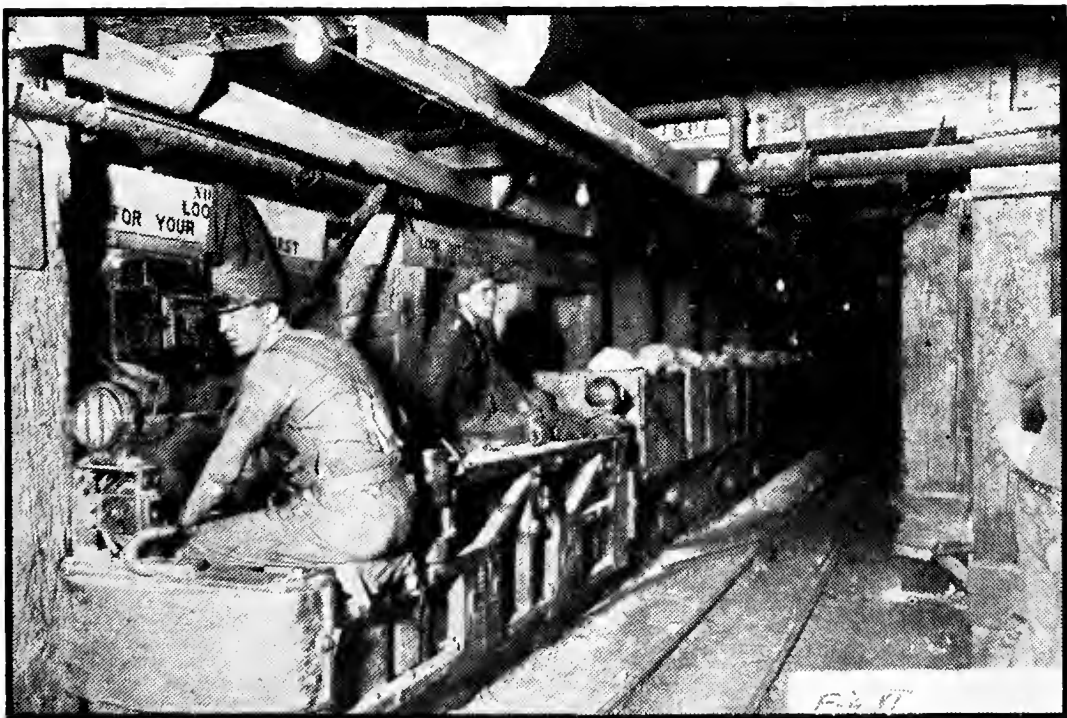
Lead.

Unlike the other metals, Montana's production of lead is not confined chiefly to Butte. The State's 1925 output of some 42,000,000 pounds was gathered from widely scattered areas, whose combined yield places Montana in sixth place among the states producing this metal.

Precious Stones.

It is reliably stated that America's chief yield of precious stones comes from the sapphire mine of Yogo Gulch, Judith Basin County, Montana; and that their value represents fully one-half of the national output in precious stones.

Yogo gem stones are acknowledged to be among the finest in the world, excelling the oriental sapphire in evenness of color, radiance under artificial light,



Electric Trammimg Underground.

and perfection in matching. The Yogo mine has been operating since 1898 and has produced about \$12,000,000 worth of sapphires. Its present annual production is about 500,000 carats of gem stones and 5,000 ounces of stones for mechanical use.

Moss agates are also found in many sections of the State and are produced commercially in a small way.

Shale.

Montana's practically inexhaustible supply of limey shale has been exploited by one manufacturer, who quarries and makes into cement some 300,000 tons each year. Two concerns quarry some 50,000 tons of gypsum, which is made into plaster and marketed in Montana and nearby states.

Phosphate.

Phosphate rock, which is plentiful in this region, can be easily combined with sulphuric acid, an important by-product in treating the local sulphide copper ores, in the manufacture of a treble super-phosphate fertilizer. Such a product (made, however, from Idaho rock), running into fairly large tonnages, has been put on the market by the Anaconda Company.

Coal.

Fifty out of Montana's fifty-six counties yield coal in commercial quantities. The varieties include semi-anthracite, bituminous, semi-bituminous, and lignite. Of all the lignite coal in the country, the United States Geological Survey reports that Montana contains 381,000,000,000 tons, or more than one-third of the nation's total. Annual normal production of all varieties is about 3,000,000 tons, the output in 1917 being raised to 4,226,000 tons. About 95 per cent of the output is used within the State, chiefly by the railroad, mining and manufacturing interests.

(See chapter on Coal Resources beginning on page 165.)

MINERALS.

Montana's mineral contribution to the world includes gold, produced in 21 of her counties; coal, possessing three varieties, besides lignite; platinum, antimony, arsenic, silver, bismuth, cadmium, chrome, copper, iron, lead, manganese, molybdenum, tungsten, uranium, and zinc. Selenium, tellurium, and palladium are also recovered from electrolytic slimes.

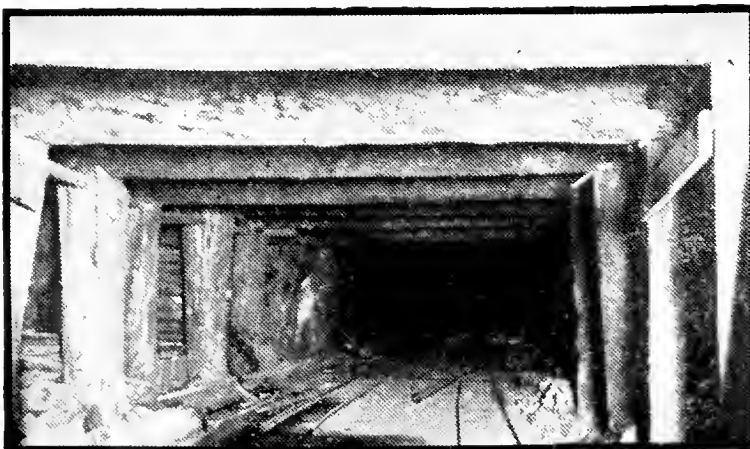
Montana is also a large producer of non-metallic minerals, among which are alabaster, asbestos, barite, bentonite.

In addition to the above she possesses deposits of pottery clays, corundum,

crystalline limestones and marbles, fluorite, Fuller's earth, graphite, gypsum, kaolin, and mica. Her oil shales are rich and carry immense potential values.

(See chapter on Fuel and Energy Resources beginning on page 137.)

Practically the entire world's supply of sapphires is derived from Siam, from Australia, and from the State of Montana. The greatest regu-



A Heavily Timbered Underground Passage.



A Three-way Mine Hoist.

lar sapphire production in the world comes from the mines of the New Mines Sapphire Syndicate, located on Yogo Creek, 25 miles southwest of Hobson, in Judith Basin County.

The syndicate owns approximately 1,550 acres and the sapphire lode extends $5\frac{1}{2}$ miles. The property includes a continuous series of 18 lode claims, two of which have been worked to a certain extent for the last 25 or 30 years.

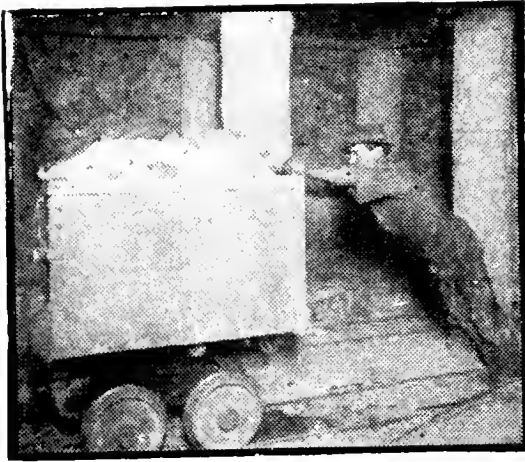
The quality of the Yogo blue sapphires is unexcelled by those of any other district in the world. The finest stones are cut partly in London and partly in Paris. Quite a number of fine stones and all of the inferior are cut in the French Jura. Inferior specimens are sold in parcels. Many caliber stones and the very thin and poorer stones are cut principally in Switzerland and from there distributed, most of the output going into watch jewelry.

Yogo Sapphires.

When Jim Ettien, a roving sheepherder, on a bleak February day in 1896 picked a handful of blue pebbles from a gopher hole, 10 miles east of Yogo Creek in what is now Judith Basin County, he made the first gesture in the development of what is really the unique industry of Montana.

Ever since 1879 prospectors had been scouring the lower water courses of the Little Belt Mountains in search of gold. In 1894 S. S. Hobson and Dr. J. A. Bovette thought they were warranted in building a flume and ditch from Yogo Creek to a point 10 miles distant. The gold netted the ditch builders less than \$1,000, and their project was a failure. But the blue pebbles, after examination by a New York gem expert, proved to be sapphires of high quality whose discovery marked the beginning of an industry which has continued without interruption for 28 years and made Montana famous in the gem markets of the world.

The ore deposit fills a vertical fissure forming a dyke similar to the diamond-bearing clay of South Africa, about eight feet wide, $3\frac{1}{2}$ miles long and of unknown depth.



An Ore Car.

The pay dirt was originally hoisted in buckets through surface cuts by hand windlass. No timbering being done, these cuts could never exceed 30 feet in depth. Tunnels were therefore dug and in 1903 a shaft was sunk, since when operations have been conducted in the orthodox manner. The principal workings are now at the 250-foot level, from which two drifts have been driven east and west.

After the ore is broken by the use of a low-power nitro explosive and brought to the surface, it looks like hard blue rock, slightly tinged with green. The sapphire crystals are distributed through this ore in no great profusion, and long

continued weathering and washing operations, to hasten disintegration, are necessary. In fact, from the time a load of ore is deposited on the dump and final disintegration permits the extraction of the last sapphire, a period of nearly four years must elapse.

All the gem stones go to London, then to France and Switzerland, where they are cut and polished. The smaller crystals, unsuitable for gems, are made into bearings for watches, electric meters and other delicate machinery, and into needle points for phonographs. The Yogo gem stones are the finest in the world.

The syndicate has given no figures as to the value of its total output during the long period it has operated. Outside estimates, however, place the retail value of finished stones from the Yogo field at between \$10,000,000 and \$20,000,000.

Yogo furnishes the only gem stones in Montana. There are, however, three other sapphire deposits in the State, on Rock Creek, Granite County; along Dry Cottonwood Creek, Deer Lodge County, and along the Missouri River for 20 miles, near Helena, Lewis and Clark County. These three beds are gravel deposits, but only one—Rock Creek beds—are being worked, and practically the entire output goes for industrial uses. Among other counties where finds of sapphires have been reported are Musselshell and Powder River.

Gold.

Gold is still an important mineral in Montana. But most of it is recovered in the process of smelting and refining copper and zinc. The year 1915 showed the largest recent production, with a yield of 242,078 ounces, valued at \$5,003,752.

For the year 1925 the United States Geological Survey, in its preliminary estimate, places Montana's production at 87,407 ounces, valued at \$1,806,700.

Montana counties which at some time or other have produced gold include Beaverhead, Broadwater, Cascade, Deer Lodge, Fergus, Judith Basin, Gallatin, Jefferson, Granite, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Phillips, Powell, Ravalli, Sanders, and Silver Bow Counties.

Platinum.

While this metal is not commercially produced in Montana, negligible amounts are reported from time to time in the sludges resulting from the refining of other metals. The United States Geological Survey also reports that "a little platinum is found in placers in the Troy district, Lincoln County, Montana," and that "a copper-nickel ore from a property at Contact, in Park County, carries an appreciable amount of platinum." From another source platinum is reported to have been found in the Frog Pond district, Granite County.

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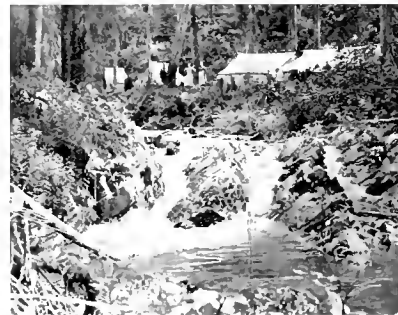


Cattle Grazing in the Foothills.



Mount Rockwell Stands Sentinel Over Two Medicine Lake, Glacier National Park

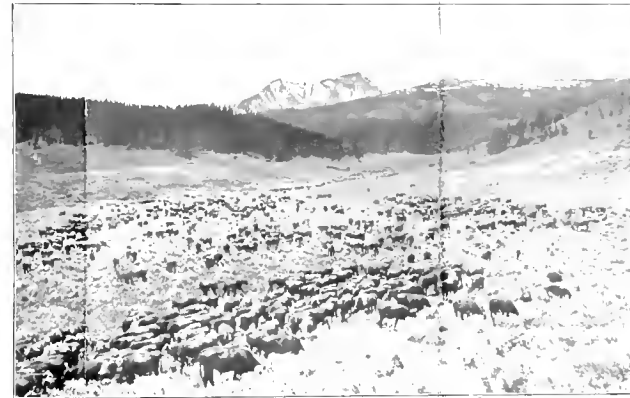
IN THE MOUNTAINS OF MONTANA



A Summer Playground



A Favorable Power Spot



Cattle Grazing in the Foothills



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Silver.

The present big production of silver in Montana is due largely to its recovery as a by-product in refining the copper and zinc ores of the Butte district. The United States Geological Survey estimates the 1925 production at 13,507,900 ounces, valued at \$9,320,450.

The counties in which silver is, or has been, mined commercially include Beaverhead, Broadwater, Cascade, Deer Lodge, Fergus, Gallatin, Jefferson, Granite, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Phillips, Powell, Ravalli, Sanders, and Silver Bow.

MONTANA MINING METHODS.

Copper.

Montana's copper production for 1925, according to the preliminary estimate issued by the United States Geological Survey, amounted to 269,520,400 pounds, valued at \$38,029,300, compared with 249,152,062 pounds, valued at \$32,638,920, in 1924.

Copper production represents about 60 per cent of the entire value of the State's metal production, and the copper mines of Butte yield about 60 per cent of the silver production of the State, together with practically all of its zinc and much of the lead. Which amounts to saying that Silver Bow County yields more than 90 per cent of the State's mineral production.

The Butte Operations.

The ores of Butte lie in fissure veins extending to unknown depths. There are two vein systems, one running, roughly, east and west, the other southeast and northwest. In the central part are the copper deposits. Beyond this copper becomes less abundant and zinc and silver are found. Farther out, copper disappears, some lead is present, and silver and zinc predominate. Beyond are the manganese minerals, and at the extreme limit only barren quartz veins.

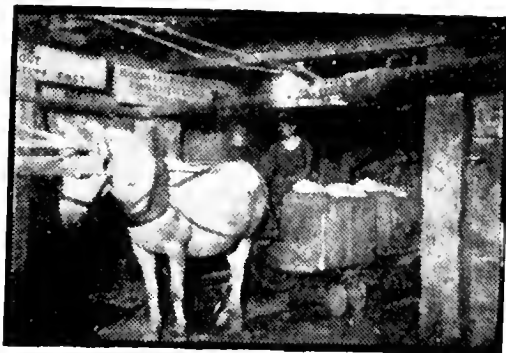
But the ore-bearing veins are not continuous either in their downward or their lateral directions. In past ages, violent earth movements caused radical displacements. One of the most baffling among the many perplexing problems confronting the Butte operator is the relocating of these lost veins. The displacements may be anything from a few inches to hundreds of feet. The Butte geologist, hunting lost veins, has a real job.

"Michigan Conglomerate."

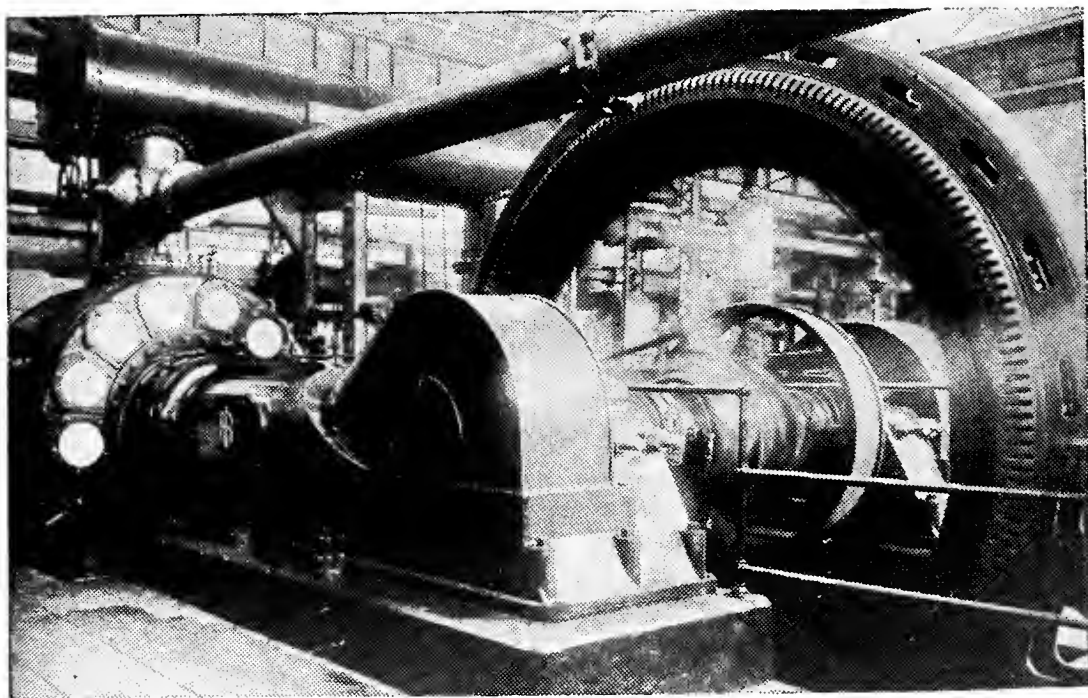
Getting ore out of fissure veins is quite different from mining along Lake Superior or in Arizona and Utah. In the northern Michigan peninsula "native" copper lies in well defined "lodes," or sheet-like bodies of "conglomerate." These lodes are continuous from the surface down and run at an inclined angle to enormous depth. Incline shafts, some of them nearly a mile deep, give access to the ore, which is removed without much difficulty.

Neither are there metallurgical problems. Aeons ago Mother Nature put to work her own reduction plant, and by heat and pressure, by roasting and flooding, there emerged from her underground smelter, in a refined state, the so-called "native" copper, or, in other words, the red metal of commerce, free from alloys or impurities.

This native copper is found in chunks



Horses Are Now Seldom Used.



Ninety Pound Air Compressor with Electric Drive.

varying in weight from a few ounces to seven tons or more. These are brought to the surface, crushed and smelted, by which simple process the copper is freed from the surrounding material, or "gangue."

"Disseminated Porphyry."

In Arizona and Utah the ores are found in a form which the mineralogist calls "Disseminated Porphyry." In Utah in particular there is a whole mountain of it. This mass of ore is a mile long and a half mile wide and 1,600 feet high. Underneath a 100-foot cap of worthless material is a deposit of some 360,000,000 tons, averaging 1.35 per cent copper.

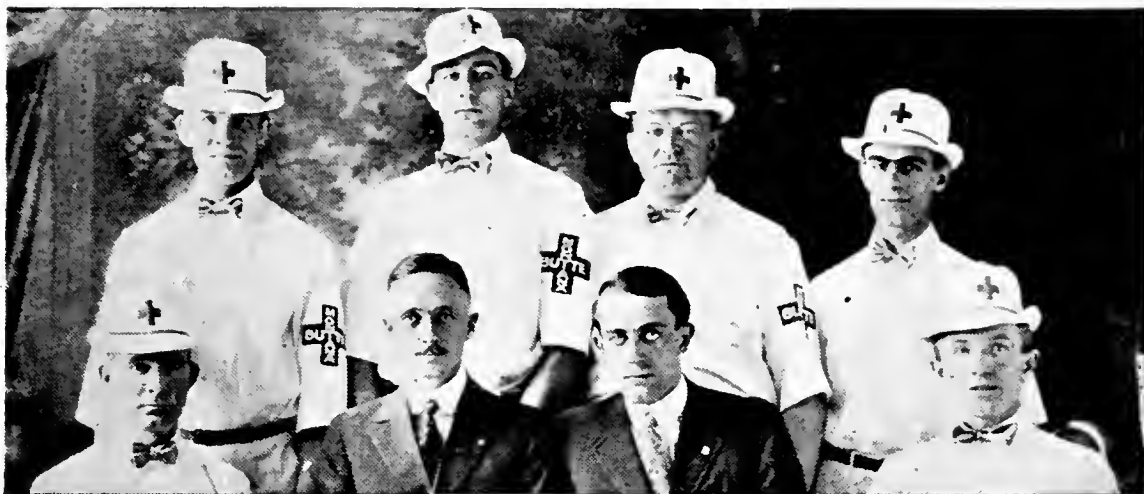
In mining these porphyries, the ore is removed either by steam shovels in open pits or, where the structure warrants it, by the so-called underground caving method. Here are no problems of stoping or cross-cutting. Little or no timber is required. There is no "groping" for interrupted veins. Shaft and hoisting expenses, pumping and ventilating problems are negligible or unknown.

Vein Mining at Butte.

Things are different in Montana.

When a Butte miner goes to work he is lowered to his labors in a steel cage suspended from a heavy wire cable passing over sheave-wheels on a head-frame and operated by a powerful compressed-air, electric or steam engine. This carries him down a timbered and fire-proofed shaft to a depth, let us say, of 3,000 feet. He gets off at the station, a hollowed-out cavern thoroughly timbered and fire-proofed. Incidentally he has passed a dozen other levels, located at 200-foot intervals, each with its own station similar to his own.

He walks along the "cross-cut" to the drift on the vein, proceeds along this and arrives eventually at a "stope," one or more floors above the drift, the scene of his day's work. In getting here, he has passed long trains of steel ore cars, each hauled by an electric engine connected with an overhead trolley, or propelled by storage battery. He has skirted wide open stretches, in which the rushing, jade



A National Prize-Winning First Aid Team of Butte Miners, with Their Instructors.

green waters, containing copper sulphate, explain the throbbing effort of a huge pumping plant, located on another level.

Underfoot and overhead are heavy, three-inch planks, held in place by huge round "stulls" or enormous sawed timbers. A distant shaft having swallowed a sufficient dose of power-driven fans is inhaling for his benefit great draughts of fresh air. The acetylene lamp on his cap flickers in the baby gale.

In the mere act of going to work, a Butte miner sees on every hand tangible proofs of enormous capital requirements. Even to get on the job he is halted at the surface until the arrival of the "chippy"—the cage in which miners ride—destined for his own level. Since only eight can ride in a "deck," it often takes half an hour to convey a single "shift" to work.

Above ground, man builds his home from the cellar up. Underground he reverses the process.

A stope is a miner's underground chamber which he fashions by blasting the ore-bearing rock above his head. At Butte there are five operations. First, the ground is drilled with a machine drill, operated by compressed air; then the holes are loaded with explosives and fired by primer and fuse. The ore is shoveled into chutes, the stope is timbered and finally, in place of the original ore, it is filled with waste rock taken from "development" work elsewhere.

Mine cars on the main level take the ore from the chutes and haul it to the station, where it is dumped into receiving pockets alongside the shaft. From here the "skips," or ore cages, hoist it to the surface and dump it into huge bins, whence electrically operated trains haul it to the reduction works at Anaconda.

Fissure-vein mining is always costly, especially when narrow veins are encountered. If 30 to 50 feet wide, a few holes bored in the vein by air drill and filled with dynamite will bring the whole mass tumbling down of its own weight. But a narrow vein, three or four feet wide, must be drilled with scores of powder holes to induce dynamite alone to free the ore.

Working Conditions.

Regarding present day working conditions in the Butte mines, Bulletin No. 257 of the United States Department of Commerce, Bureau of Mines, has this to say:

"No other metal-mining district now being worked in the United States can show such intensive mining in a small area, and probably in none have the mine operators to cope with more difficult mining conditions. High rock temperatures



The Dark Streak Is a Vein of Butte Ore,
the Light Rock Waste.

in the deep workings, heavy ground requiring extensive timbering with consequent danger of disastrous mine fires, and in addition the potential danger to health by dusts produced in mining siliceous ores must all be met.

"The intensive investigations at Butte were begun in 1916. At that time the records show that miners in many places in the mines worked in hot, humid air with little or no movement. Bad fires in old stopes were inclosed as well as possible by fire walls, but poisonous gases occasionally leaked through the ground. A few

mines had only one shaft, that is, only one means of exit in the event of a fire or other disaster. Few of the mines had adequate ventilating fans on the surface, and these fans were not reversible. Dry drilling was general and no spraying was done; the miners were subjected to breathing siliceous dust; miners' phthisis was prevalent and the death rate from pulmonary troubles was high.

"The reader should note that Butte mining methods then were no worse, nor were fewer precautions taken, than in other metal mining districts of the United States; on the contrary, they were as up to date, and their condition is recorded as illustrative of what then was true in the United States. Most of the mine operators had already begun, on their own initiative, to improve conditions underground. The largest company had begun to install large fans. By 1914 safety measures had assumed such importance at Butte that the vice president of this company gave his entire time to the safety department; by 1915 he had established a central mine-rescue station and had placed that work in charge of a former experienced member of the Bureau of Mines.

"As the investigations of the Bureau of Mines proceeded, its findings and suggestions were imparted to the respective mine managements, compared with their own findings, and largely adopted. The advance that has been made in the 10 years through the cooperation of Government and companies, as pointed out in this report by Messrs. Rice and Sayers, had been notable—perhaps greater than that achieved by any other large mining district in the United States. . . .

"Attention is called to the advances made—good systems of mechanical ventilation, wet drilling, fireproofing at shafts and stations and around underground electrical installations, training of many men in first aid and use of oxygen breathing apparatus, and the building of an organization to see that improvements are properly maintained. . . .

"The fatality rate for the Butte district during the three years 1920-1922 was 4% lower and the injury rate was 12% lower than the corresponding rates for all metal mines in the United States."

On the surface, Butte is a city of 60,000 people, with 253 miles of streets. Underground she's a beehive, with 15,000 toilers working in a honeycomb containing 2,700 miles of passageways. The Anaconda Company drives 35 miles of new passages every year.

In spite of their refractory nature and the difficulty and expense of operation, Butte has produced in 48 years 130,000,000 tons of copper ore. If loaded upon a single train it would stretch half way around the globe. And if the 8,000,000,000 pounds of copper content were drawn into telegraph wire it would girdle Mother Earth spirally from pole to pole with a copper corset-lacing 50,000,000 miles long.

Zonolite.

One of the unique mineral resources of Montana is zonolite. Practically a whole mountain of this strange substance, located within a few miles of Libby, Lincoln County, was long considered mica float by expert geologists. Further investigation proved its unique character and a special term, "zonolite," was invented to identify it.

After being removed from the mine, the ore is subjected to a simple heat treatment, after which it is ready for a score or more valuable uses in the industrial world. As an insulating material it is said to be excelled by no other known substance, taking the place of asbestos, slate, Bakelite, and similar materials. A Spokane manufacturer is now manufacturing from it zonolite calso-mine and a zonolite plaster. Plans are now being perfected for its manufacture into gold, silver and other colored paints, and wall papers. Recent buyers of zonolite include manufacturers of switchboards for power plants as well as refiners of crude oil. Belgium is also buying zonolite in considerable quantity for special uses in some of her numerous manufactories.

Although an infant industry, the processing plant at Libby has already outgrown the demand and the management has recently begun the erection of a much larger structure, equipped with automatic charging and fueling devices, milling and grinding machinery, screens and sacking machines and storage bins accommodating ten carloads of processed product. A 500-ton aerial tramway from mine to mill is also under construction.

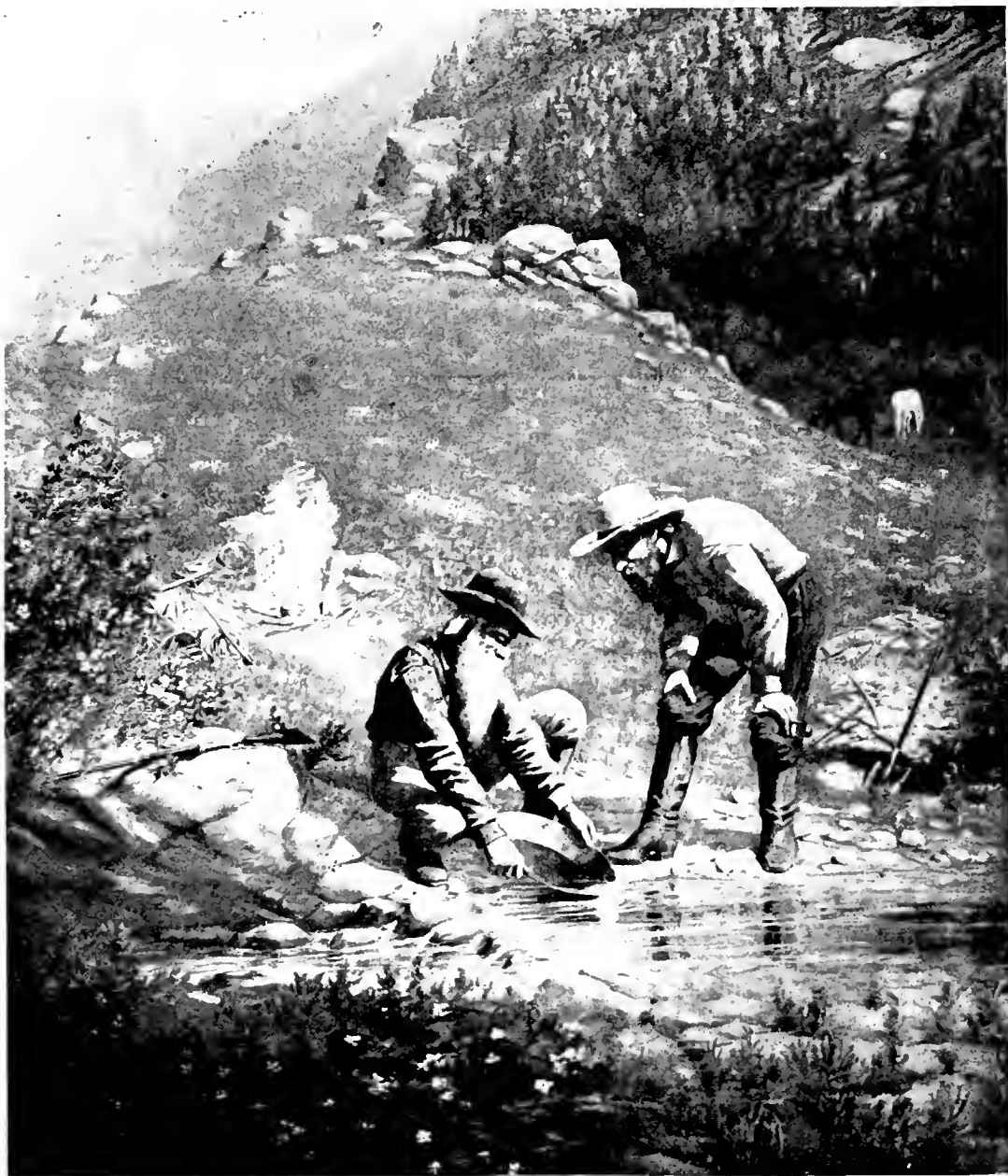
Zinc.

From Montana ores alone, 102,500,000 pounds of zinc were produced in the State during 1925, according to the preliminary estimate by the United States Geological Survey. In addition, some 56,000,000 pounds of zinc slab were manufactured from ores originating in neighboring states and Canada.

In the spring of 1926, the Anaconda Company completed the enlargement of its



Hard Rock Butte Miners "Taking Five" 2200 Feet Underground.



Pioneer Gold Prospectors.

electrolytic zinc plant at Great Falls with a corresponding increase over its original capacity of 33 1/3 per cent. The result is a monthly capacity of 20,000,000 pounds of zinc slabs, this being the largest output of any electrolytic zinc refinery in the world.

The enlargement of this plant is of vital significance not only to Montana but to Idaho, Utah and British Columbia, from which districts large consignments of zinc concentrates are being shipped regularly for refinement and conversion into commercial metal. In fact, most of Anaconda's zinc comes from ore mined and concentrated at mines owned by other companies, making Anaconda mainly a custom leacher and refiner of zinc concentrates.

Although the United States Geological Survey's preliminary estimate for 1925 placed Montana in fourth place among the States as a zinc producer, it is not improbable that the enlargement of the Great Falls plant and the corresponding increase in output will soon put Montana at, or near, the head of the list.

Lead.

The Geological Survey's preliminary estimate places Montana's 1925 production of lead at 41,991,470 pounds, valued at \$3,804,400. This was a noteworthy increase over 1924, when the production was reported at 39,476,008 pounds, valued at \$3,158,081.

The lead smelting plant of the American Smelting & Refining Company at East Helena was quite active, treating ore and residues from Montana as well as lead concentrates from Idaho.

(See also chapter on Lead Smelting.)

Among the lead producing states, Montana occupied sixth place in 1925.

Commercial production of lead in Montana has been reported from the following counties: Beaverhead, Broadwater, Cascade, Deer Lodge, Fergus, Jefferson, Granite, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Powell, Ravalli, Sanders and Silver Bow.

Nearly 70 per cent of Montana's 1925 output came from half a dozen properties in Silver Bow County.

Manganese.

The principal deposits of manganese ore in Montana are located in the Philipsburg and the Butte districts. These are pronounced by the Geological Survey "the greatest, best developed and most valuable domestic reserves of high grade manganese in the country. . . . The bodies of rhodochrosite in Butte . . . are among the largest and most valuable sources."

The survey report points out that the Philipsburg ore is suitable for the manufacture of dry cell batteries, for which some 50,000 tons of ore are consumed annually at a price two or three times that paid for ore of ordinary grade. The report further points out that the Butte deposits can be developed and the ore removed without additions to present workings from which other metals are now being extracted. Butte also possesses abundant facilities for concentrating the ore and making ferro-alloys.

Butte and Philipsburg at present are the only Montana districts in which manganese is being commercially produced. Deposits ranging from high to low grade are, however, reported by the Geological Survey in Castle district, Meagher County; Neihart, Cascade County; Wickes and Renova, Jefferson County; three miles northwest of Aenceny, Gallatin County; on Trapper Creek, nine miles west of Melrose, Beaverhead County; in Dry Georgia Gulch, east of Twin Bridges, and seven miles southwest of Norris, Madison County.

Philipsburg furnishes a black manganese ore, which is readily made suitable for the manufacture of dry cell batteries. Butte's pink ores make ferro-manganese, indispensable in steel manufacture.

In 1925 Montana, the principal producer of manganese ore in the United States, shipped more than 53,000 tons of this commodity.

Arsenic.

The commercial production of arsenic in Montana has been confined to the operations of the Jardine Mining Company in Park County and the Anaconda Copper Mining Company, the latter producing arsenic as a by-product of copper concentration and smelting.



Sulphuric Acid Plant, Anaconda.



Electrolytic Copper Tank Room.

Arsenopyrite occurs abundantly in the Jardine ores, which have long been a source of arsenic. Within the past three years a roaster, arsenic kitchens and a refining furnace have been added to the plant, the first output of white arsenic being made in March, 1923.

The Anaconda Company at its Anaconda Reduction Works recovers white arsenic from flue dust and precipitated fumes from the smelter flue system and Cottrell treaters.

In 1924 Montana produced in excess of 12,500,000 pounds of arsenic, or more than any other state in the Union.

Cadmium.

There are several cadmium minerals, but none of them occurs in quantities large enough to be called ores. Commercial cadmium is derived from zinc minerals and ores, in which it nearly always occurs in minute quantities, the ratio in Butte ores being about one of cadmium to 500 of zinc.

Of the six or eight concerns in the United States making cadmium, the Anaconda Copper Mining Company, at its Great Falls plant, is the only Montana concern producing this metal. This company began making metallic cadmium early in 1923 and its production in 1925 amounted to 105,190 pounds. The recovery of cadmium is incidental to purifying the zinc solution at the electrolytic zinc plant.

Metallic cadmium is used as an alloy in materials requiring a low melting point, such as sprinkler system heads, releases on fire doors, in stereotype plates, silver plating and dental amalgam. Cadmium is reported to be a better rust resister than nickel.

MINERAL PRODUCTION IN MONTANA*

Year	Gold	Silver	Copper	Lead	Totals
1862 to 1881	\$200,000,000	\$11,000,000	\$-----	\$-----	\$211,000,000
1882	2,550,000	4,370,000	1,539,860	-----	8,459,860
1883	1,800,000	6,000,000	3,452,960	226,424	11,479,384
1884	2,170,000	7,000,000	5,386,500	246,326	14,802,826
1885	3,400,000	11,500,000	6,779,800	274,350	21,954,150
1886	4,402,000	13,849,000	5,761,200	491,132	24,526,332
1887	5,978,536	17,817,548	8,853,750	607,662	33,257,496
1888	4,200,253	15,790,736	15,103,946	569,160	35,664,095
1889	3,500,000	19,393,939	13,334,970	456,975	36,685,884
1890	3,300,000	20,363,636	16,630,958	964,089	43,029,827
1891	2,890,000	20,139,394	14,377,336	1,229,027	38,635,757
1892	2,891,386	22,432,323	19,105,464	990,035	45,419,208
1893	3,576,000	21,858,780	16,630,958	946,089	43,029,827
1894	3,651,410	16,575,458	17,233,718	730,551	38,191,137
1895	4,327,040	22,886,992	21,114,869	754,360	49,083,261
1896	4,380,671	20,324,877	25,356,541	670,010	50,732,099
1897	4,496,431	21,730,710	26,798,915	928,619	53,954,675
1898	5,247,913	19,159,482	26,102,616	809,056	51,319,067
1899	4,819,157	21,786,835	40,941,906	909,410	68,457,308

*For table showing Mineral Production in Montana from 1900 to 1925, inclusive, see page 122.

FUEL AND ENERGY RESOURCES*



*Raw, Process, Energy and Fuel Materials found in Montana—Use,
Location of Deposits, Etc.*



COAL

See chapter on coal and coal mining in Montana.

ELECTRICITY

See chapter on hydro-electric water power developments in Montana.

NATURAL GAS

Uses—An ideal domestic fuel and used especially as an industrial fuel in glass works, cement plants, brickyards, factories and metallurgic plants. Also used in making carbon black, a constituent of rubber tires, paints and inks. From some natural gas the gas helium, used as a non-inflammable substitute for hydrogen in balloons, is extracted.

Occurrence—On the Cedar Creek anticline in Fallon, Prairie and Dawson counties; in Elk Basin, Carbon county; near Havre, Hill county; in the Sweet Grass hills in northern Liberty county; near Shelby, Toole county; 35 miles southeast of Big Sandy, Choteau county; at Antelope Point, Stillwater county; in northern Liberty county. Reported by U. S. G. S. in Cone Butte Dome, Fergus county. But little attention has thus far been given this resource. Billings, Bridger, Fromberg and Laurel use the gas from Elk Basin for light and fuel; Glendive and Baker from the Cedar Creek anticline, and Havre from the Hill county field. The gas from the Toole county field is being used in Shelby. An investigation is under way with a view of extending its use, with that of the northern Liberty county field, to Great Falls. Plans are also being considered to extend the use of the gas from the Cedar Creek anticline to a number of other eastern Montana towns besides Glendive and Baker. There is one carbon black plant near Baker, Fallon county, where 11 to 12 wells have been brought in. On Cabin Creek, 20 miles north of Baker, there are three gas wells, two of which are of considerable size. In 1921 Montana produced, according to the U. S. G. S. 336,000 M cubic feet of gas with a value at point of consumption of \$89,300. In the past few months many new gas wells have been brought in, with a reported production ranging from one million

*Revised February, 1926, by J. P. Rowe.



Where Montana Metal Is Found.

to thirty-five million feet of gas per well a day. The Cedar Creek anticline is said to be one of the largest gas fields in the United States. The Toole county field is reported to have available from twenty-five to thirty million feet of gas a day that runs over 90 per cent methane. The estimated flow of one well in the northern Liberty county field, which is the most recent to be discovered, is thirty-five million cubic feet a day. Natural gas was discovered in Montana as far back as 1892. A second carbon black plant is proposed (February, 1926) at Billings.

PETROLEUM—See Chapter on Petroleum in Montana.

MINERALS—METALLIC

ALUMINUM

Uses—In household utensils, instruments, parts of internal combustion engines and many other articles in which lightness or resistance to oxidation, or both, are essential. Bauxite, the most important ore of aluminum also used for making artificial abrasives by fusing it in the electric furnace, for producing aluminum salts, and for making refractory brick for furnace lining.

Occurrence—Reported on Sweeney Creek, west of Florence, Ravalli county.

ANTIMONY

Uses—Principally for making alloys with other metals, oxides in enamels and pigments, sulphides in pigments, vulcanizing rubber and safety matches. In war used for hardening bullets, in shell primers and in powder designed to produce dense smoke or explosion.

Occurrence—Reported in Sanders county, on Prospect Creek, in blanket beds, some of which are three feet thick. Also contained in the grey copper ores of the Butte district which run about 25 per cent antimony. This is not being recovered as a by-product. U. S. G. S. says antimony deposits in this state have been worked only during high prices. Also found in Missoula county.

BISMUTH

Uses—In metallic form for making low-fusing alloys or cliché metals which are used in automatic fire sprinklers, fuses for electric wiring, and solders. Some of the salts have a smooth unctuous feel, and are used in face and toilet powders and in medicinal preparations. Also employed to a small extent in making optical glasses.

Occurrence—With the copper ores of the Butte district which tests made in 1911 showed carried 20 pounds bismuth to the ton. Investigator reported not worth saving at \$35 a ton, but U. S. G. S. confident process will be evolved for isolating bismuth from flue dust as rich as that derived from Butte ores.

CADMIUM—See Chapter on Mining in Montana.

CHROMITE

Uses—It is the chief ore of the metal chromium which is smelted in the electric furnace to produce the alloy of iron and chromium called ferrochrome, used in making chrome steel, another alloy, remarkable for its hardness. Fuses or melts only at a very high temperature and used as refractory material for lining furnaces. Chemical compounds of chromium are used in making pigments, dyes and mordants in oxidizing, bleaching and tanning.

Occurrence—Two deposits of chromite are reported in Montana by the U. S. G. S., one, 10 miles southwest of Red Lodge, between Rock Creek and West Fork of Rock Creek (Carbon county), and the other in Stillwater and Sweet Grass counties. This latter deposit starts on Boulder River in Sweet Grass county, 10 miles south of McLeod, and extends in a general direction south of east for 27 miles, to Fishtail Creek, in Stillwater county. It is not only one of the largest deposits in the United States, but the U. S. G. S. says, "the form of occurrence of the chromite in this belt is radically different from that of deposits farther west, in California and Oregon, and that there is much stronger reason for counting on continuity in depth here than there."

Estimates of the available tonnage have been made for only 19,000 feet in a total length of 27 miles. This estimate is 350,000 tons to a depth of 100 feet, but the U. S. G. S. says without doubt the ore goes beyond that depth to a considerable distance, possibly 1,000 feet. Seven samples returned assays averaging 36.5 per cent of chromic oxide with an iron content of 16 to 19 per cent. The assays were taken in the main, or high grade ore body which averages 12 inches to two feet thick. The mixed ore, which averages four feet in width, assays 5 to 25 per cent chromic oxide. Concentrating tests, it is reported, show the mixed ore will concentrate to a 39.8 per cent chromic oxide ore with a 53 per cent saving of the chromite. The assays made of this chromite ore indicate it will suit the requirements of steel manufacturers. In making a ferrochrome containing six per cent of carbon it is necessary to use a chrome ore containing at least twice as much chromium as iron in order to produce a ferrochrome containing 60 per cent of chromium.

Robert M. Keeney of the Bureau of Mines is quoted to the effect that "ferrochrome can be easily manufactured directly from chromite in the electric furnace." The U. S. G. S. says: "The metallurgy of chromite has apparently been so developed in the hydro-electric process as to utilize to advantage relatively low grade ores such as are most abundant in the United States, and the further development of that process on the Pacific coast, where water power abounds, would greatly diminish the handicap of long transportation."

In 1919, 61,404 long tons of chromite were imported into the United States.

COPPER—See Chapter on Mining in Montana.

GEMS AND PRECIOUS STONES—See Chapter on Mining in Montana.

GOLD—See Chapter on Mining in Montana.

IRON

Uses—Modern civilization is based upon the fabrication of this metal. This is the age of the machine, mostly made from steel, a product of iron.

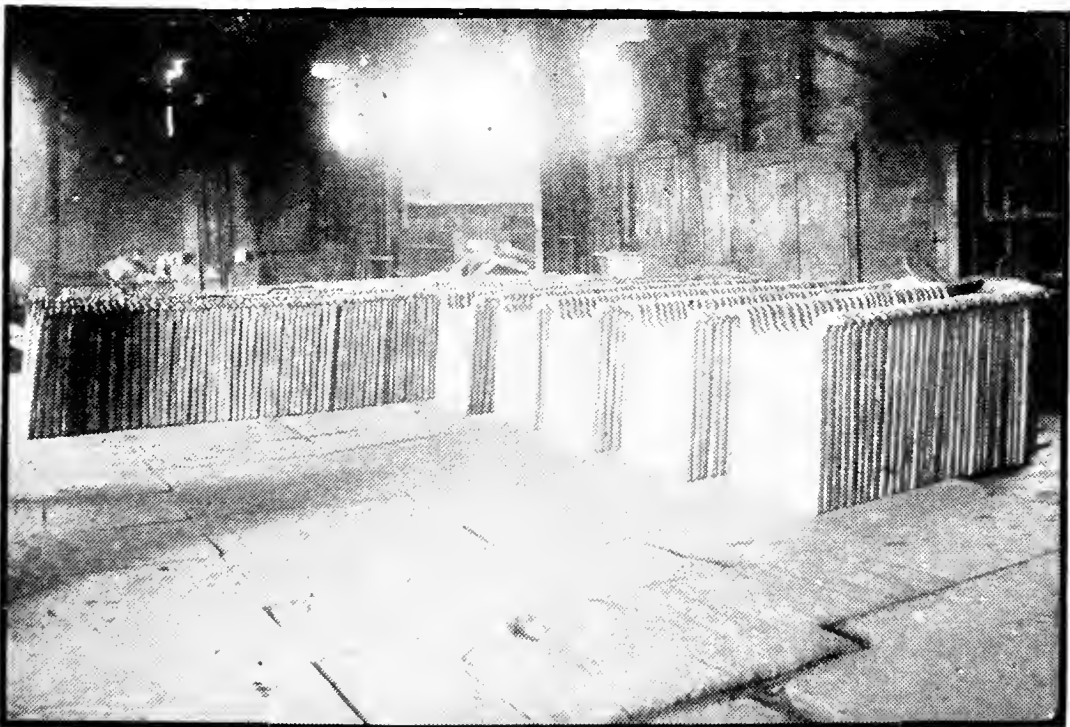
Occurrence—Three deposits of iron ore in Montana have been reported by the U. S. G. S., but there are reports of many other deposits, upon one of which—in Meagher county—considerable exploration work has been done. This deposit and the one in Cascade and Judith Basin counties which has been examined by the U. S. G. S. are the only ores in the state at present of known commercial importance.

In central Montana, on Running Wolf and Dry Wolf Creeks, 12 miles southwest of Stanford, on the Great Northern Railway, and about 54 miles southeast of Great Falls (Cascade and Judith Basin counties), is found iron ore known as the Running Wolf hematite deposits. The ore bodies range in width from five to 60 feet and average about 20 feet. On two claims at the east end of the property, the U. S. G. S. estimates there are one million gross tons of ore. The U. S. G. S. says: "The ore in places contains enough magnetite to make it react to the magnet. It is not to any large degree limonitic at the surface. At one point where a considerable depth has been reached, the ore contains a little pyrite and chalcopyrite. Mineralogically, the ores are entirely satisfactory for steel manufacture. Ore is exposed at points along the middle of the belt, but no estimate of tonnage can be attempted here. At the west end showings are better. Ore appears at intervals through a distance of nearly a mile, and the average of the thickness of the ore body in the different openings is 20 feet. The present availability of this ore depends on several factors which cannot be considered in this paper, such as the cost of transportation to central and eastern manufacturing points and the possibility of economic production of iron in the nearby Rocky Mountain region."

Extensive deposits of high grade iron are reported on Sheep Creek in the northern part of Meagher county. It is said the mineralized area extends through the Belt Mountains 50 miles, but the workable deposits are found in a circular area of 2,500 acres. The iron content is said to range from 35 per cent in soft earth to 65 per cent in two main outcroppings of iron cliffs. Private geologists have reported from 80,000,000 to 140,000,000 tons of workable ore in sight, of which 100,000,000 tons could be recovered by means of the steam shovel. The ore body has been prospected to a depth of 40 feet without going out of ore, and geologists report the contour is such as to indicate the ore goes to a depth of 200 feet.

The U. S. G. S. reports the existence of magnetite beds over the west half of the Blackfeet Indian reservation, Glacier county, which can be traced for many miles entirely across the reservation. The principal beds are found on the South Fork of the Milk River. The beds are a number of small, widely scattered areas which contain rich magnetite sandstones reaching a thickness of nine feet, with an average thickness of four to five feet. The U. S. G. S. says a considerable tonnage of ore which would average about 50 per cent of iron could be hand sorted from the deposits. It concludes: "The proportion of titanium oxide in the ores is considerable, averaging over 12 per cent in one sample. This high titanium content renders these ores unfit for use, according to present metallurgical practice, although it must be recognized that ores of this type may eventually be successfully smelted."

On the south side of Birch Creek, about half a mile south of the Indian Queen mine, six miles west of Apex station, Beaverhead county, the U. S. G. S. reports deposits



Anodes at Anaconda Smelter.

of magnetite iron ore. They occur as irregular pockets and have been opened by shallow pits and shafts to obtain fluxing material for copper or lead smelters.

Reported that Smoky Butte, 10 miles west of Jordan, Garfield county, is a mountain of high grade iron ore. Much meteoric iron found in that region and particularly near Smoky Butte. So far as known, no examination by geologists has ever been made.

In 1919, 476,461 long tons of iron ore were imported into the United States.

LEAD—See Chapter on Mining in Montana.

MANGANESE—See Chapter on Mining in Montana.

NICKEL

Pyrrhotite which contains nickel is closely associated with the chromite deposit near contact.

MOLYBDENUM

Uses—A metal of potential rather than actual use. Encouraging results reported from experiments made with a view of using small quantities molybdenum to make steels of high tensile and torsional strength and great elasticity. Also used in incandescent lamps and in X-ray tubes.

Occurrence—The U. S. G. S. says, "among the principal deposits of molybdenum ores known are . . . near Emigrant (Park county), and at other places in Montana." Also reported by U. S. G. S. in Potosi mining district, 14 miles southwest of Pony, Madison county. Reported two miles east of Ophir, Powell county, and also 30 miles northwest of Dillon, Beaverhead county, 10 miles west of Oregon Short Line. Wulfenite, a lead molybdenate, is found near Radersburg, Broadwater county.

In 1919, 106,743 pounds of molybdenum ore were imported.

PLATINUM—See Chapter on Mining in Montana.

SILVER—See Chapter on Mining in Montana.

TIN

Stream tin is found in the sands and gravels of the upper Bitter Root River.

MONAZITE

Used in the manufacture of mantles for incandescent lights. Found in the sands of most streams of western Montana.

TUNGSTEN—See Chapter on Mining in Montana.

URANIUM

Uses—As an alloy for making high speed tools, in gas mantles and electric lamp filaments; in salts and other forms used for iridescent glass and pottery glazes, in porcelain-painting and calico-printing, in medicine and in chemical determinations. Most widely known as the chief source of radium which is extracted chiefly from the carnotite and pitchblende ores of the uranium group.

Occurrence—State School of Mines tested sample of uranium ore from Carbon county that ran about 25 per cent in radioactivity.

In 1919, 6,026,005 pounds of steel hardening ore were imported.

ZINC—See Chapter on Mining in Montana.

METALS—NON-METALLIC

ALABASTER

Uses—A fine-grained variety of gypsum occurring in the massive form. For small statues and other ornamental designs.

Occurrence—Large deposits reported by Rowe in the Little Snowy mountains in Fergus and Golden Valley counties.

ARSENIC—See Chapter on Mining in Montana.

ASBESTOS

Uses—Fireproof cloth for firemen's suits, theater curtains, steam packing and other forms of heat insulation and non-conducting coverings; low-grade material constituent of various building products; in electrical industry where both insulation and resistance to high temperatures are required.

Occurrence—Reported in Gallatin county, 16 miles northwest of West Yellowstone, and also in Madison county, in Madison range east of Ennis. Also in Bear Tooth Mountains, south of Red Lodge, Carbon county.

BARITE

Uses—In pigments, as sizing for papers and textile fabrics, in manufacture of rubber, asbestos, cement and in tanning. Compounded with zinc sulphide used as pigment in white enamel paints, and in manufacture of linoleum and oilcloth.

Occurrence—Reported by Rowe on Pattee Creek, two miles southwest of Missoula, Missoula county; in Ruby Mountains, Madison county; on Cabin Creek, 25 miles south-east of Ekalaka, Carter county; on Cedar Creek, 25 miles from its mouth, in Wibaux county. Missoula deposit described as one of the best and purest in northwest and of commercial importance. Also reported near Stanford, Judith Basin county.

BENTONITE

Uses—Sizing for paper, absorbent in dynamite manufacture, retarder for gypsum plasters, constituent of a remedial dressing (antiphlogistine), adulterant in candies and drugs, de-inking of wood-pulp papers.

Occurrence—Reported six miles northwest of Hysham, Treasure county, in deposit five miles long and up to a mile wide, 10 to 30 feet in thickness.

BUILDING STONES

Uses—With a growing population and a rapidly decreasing timber supply, there must come an increasing use of stone and artificial building materials for building and public works. The essential qualities of building stones are strength, durability, workability, color and beauty.

Occurrence—According to Rowe, who has made the only survey of this resource, Montana is well supplied with many varieties of good building stones. East of the Rocky Mountains the stone is mostly sandstone; in the western part of the state, granite, quartzite, limestone and phyllite are the principal kinds of rock. In a few places, especially in the western third of the state, volcanic ash is used as a building stone. Rowe states a sandstone quarry is found at almost every town from Wibaux, in eastern Montana, to Livingston, 350 miles west, while from Helena west to the Bitter Root Mountains, both north and south, are found granite, phyllite, and quartzite in large quantities and at many localities.

Sandstone quarries are mentioned by Rowe in Beaverhead, Carbon, Cascade, Hill, Custer, Fergus, Sweet Grass, Stillwater, Yellowstone and Park counties. The Beaverhead, Stillwater and Yellowstone sandstones pronounced among the best in the state. Some of the best buildings in Salt Lake were constructed of Beaverhead county stone, and the softer purer white variety has been used as a flux at Anaconda. Rowe says this softer kind is without doubt the purest quartz sandstone in the state, and when crushed resembles glass sand, for which purpose it would undoubtedly be good. The original state capitol at Helena was built of Stillwater county sandstone.

Granite quarries are mentioned by Rowe in Lewis and Clark, Jefferson, Silver Bow and Ravalli counties. The wings of the state capitol at Helena were constructed of Jefferson county granite.

The finest colored quartzite in the state is probably found in Beaverhead county, according to Rowe, and the largest quantity in Missoula county. In Beaverhead county, he says, is found the best volcanic ash building stone in the state. Other counties named as being among the chief producers of this stone are Gallatin, Rosebud, Missoula and Ravalli. The best quarry of phyllite or silicious slate is in Flathead county. This stone is also found in Missoula county.

CLAYS

Uses—For pottery ware including porcelain, china, granite and earthenware, various kinds of brick, flooring, terra cotta in moldings and decorations, for irrigating and drain tile, water conduits, sewer pipes, ventilating flues. In the industrial arts for crucibles, retorts, furnace and stove linings, puddling hearths, smelting furnaces, glass pots, insulating materials in electrical engineering, filling for walls, sizing and filling for paper, cement manufacture, mineral paint and paint adulterants and experimentally in manufacture of aluminum. Among the most important kinds of clay are china clay, kaolin and indianait, usually mixed with feldspar and used in whiteware, porcelain, tiles, insulators and for sizing and weighting paper. Ball clay and ware clay, a white burning plastic clay used in pottery industry to give strength and plasticity to the non-plastic clays. Fire clay, chiefly residual or sedimentary clay possessing high refractoriness, used in fire bricks, furnace linings, retorts, crucibles, tiles, terra-cotta, pressed brick, etc. Much of the fire clay produced comes from beneath coal seams. Brick clays, impure plastic clays usually with a high percentage of fluxing impurities which cause them to burn to a hard product at a low temperature. Stoneware clay, a refractory or semi-refractory vitrifying clay of sufficient tensile strength and plasticity



Row of Convertors at Anaconda Smelter.

to be workable on a potter's wheel. Fire proofing and hollow brick clay should have rather high plasticity, fair tensile strength and should burn to a good hard but not vitrified body at a comparatively low temperature. Washed kaolin and certain fine-textured, fairly plastic sedimentary clays free from sand are used to give body, weight and firmness to various kinds of paper. Cement clay should contain 60 to 70 per cent of silica and the iron oxide and aluminum together should not exceed one-half the percentage of silica.

Occurrence—The only general survey of Montana's clay resources was made by Rowe. He reports deposits of brick clay at several places in Missoula, Sanders, Flathead and Ravalli counties, in Lewis and Clark, Silver Bow, Powell, Cascade, Rosebud, Yellowstone, Gallatin, Phillips, Valley, Park, Blaine, Hill, Beaverhead, Carbon, Granite and Fergus. The U. S. G. S. reports brick clay in Sheridan county.

Rowe reports deposits of fire clay in Powell and Jefferson and at two places each in Lewis and Clark, Cascade and Flathead counties.

Pottery clay is reported in Powell, Missoula and Gallatin counties, at several places in Sanders, Flathead and Ravalli counties, beneath coal veins in Fergus county, and possibly exists in Sheridan and Carbon counties. The clay in Carbon county may contain too much pyrites for pottery purposes, and the color of the Sheridan county clay may be objectionable.

The U. S. G. S. reports bed of clay between Plentywood and Redstone, Sheridan county, known extent of which is 18 miles east and west and eight miles north and south. Bed from three to eight feet thick. U. S. Bureau of Standards tested representative samples and reports the "clay appears to be a promising one for the manufacture of common and face brick and possibly drain tile and fireproofing. The buff color developed by burning would not permit its use in the manufacture of whiteware pottery. However, the clay has properties similar to those used in the manufacture of stoneware." The U. S. G. S. points out that the presence in the area of lignite will aid greatly in the exploitation of the bed and the manufacture of clay products and the report concludes: "Though the local demand for the clay products may not be great, the association of lignite and clay, together with the advantages of location and transportation, may make the deposit valuable to the prospective manufacturer."

CORUNDUM (Industrial)

Uses—As an abrasive. Molded into wheels, whetstones, slips, hones and oil stones. Also used in powder of various degrees of fineness and made into abrading papers for polishing, stone and gem cutting and polishing, dental work, glass frosting and etching, and wood-working. In the gem form as a sapphire used for bearings in many delicate precision instruments, such as watches and various meters.

Occurrence—Reported by U. S. G. S. on headwaters of Elk Creek, 23 miles south of Belgrade, Gallatin county. Corundum-bearing rock eight to ten feet in width. Corundum crystals vary from fraction of an inch up to eight inches and have been found up to two pounds in weight. Concentrated in seams, some of the smaller ones consisting of pure corundum and the larger ones carrying 10 to 70 per cent corundum. U. S. G. S. says it is reported this deposit is a good abrasive, and a fire test proves it can be used in the manufacture of a vitrified wheel. Another deposit reported five miles west of this one, and a third deposit 14 miles southwest of Bozeman.

As a sapphire is found in gravel deposits on Rock Creek, Granite county. This deposit is being worked and practically the entire output goes into industrial uses.

CRYSTALLINE LIMESTONES AND MARBLES

High grade deposits of marble are reported from a number of places in Montana. There has been practically no commercial production, however. Near Manhattan, Gallatin county, is a deposit of travertine onyx. Rowe reports the stone is of good grade and the product similar to the Mexican variety and that it takes a splendid polish. In Nelson Gulch, southwest of Helena, Lewis and Clark county, is reported a deposit containing seven distinct varieties of marble, Creoles, Sinais and Egyptian blacks and creams, white statuary marble, carrara marble, blue marble, and Georgia white marble. It is reported a good quality of marble is found on Dempsey Creek, Powell county. Marble deposits are reported north of Lothair, Hill county; also near Townsend, Broadwater county, near Dewey, Beaverhead county, and near Garnet, Granite county.

A large deposit of variegated marble lays along the crest of a ridge near Townsend in Broadwater county. The deposit contains a large amount of black and gold marble, plain black, black and white together with other veined and banded marbles. Specimens of this deposit have taken a high polish. In this same area is also considerable grey marble suitable for building stone.

DIATOMACEOUS EARTH

Uses—Polishing powder, filter stone, wrapping pipes, fireproof cement, etc.

Occurrence—Flint Creek valley, Granite county; near Townsend, Broadwater county.

FLUORITE

Uses—Chiefly as a flux in manufacture of basic open hearth steel. Also as a flux in blast furnaces. Considerable quantity used in manufacture of glass and enameled ware; in electrolytic refining of antimony and lead; production of aluminum, and in manufacture of hydrofluoric acid.

Occurrence—Reported by U. S. G. S. in the Potosi mining district, 14 miles southwest of Pony, Madison county. Varies in color remarkably in this district, being purple, green, blue, white or black. Also reported near Mullan Pass, west of Skyline, Lewis and Clark county.

In 1919, 6,943 short tons of fluorite were imported into the United States.

FULLER'S EARTH

Uses—Used for scouring and cleaning cloth and more extensively for clarifying fats, oils and greases. Extensively used in refining petroleum. Coarser grades for coarse pottery, brick, tile and pipe.

Occurrence—Reported south of Baker, Fallon county, also in Silver Bow county.

GRAPHITE

Uses—Manufacture of crucibles and other refractory products, lubricants, lead pencils, paint, foundry facings, preparation to loosen boiler scale, polish for gun powder, and in electrical work. Largest quantity used in making crucibles, which for this purpose must be of the crystalline variety, with a content of graphitic carbon exceeding 85 per cent, and free from mica, pyrite and iron oxide. Amorphous graphite, which can be made in the electric furnace, is suitable for most other uses.

Occurrence—On ridge between Van Camp Creek and Timber Gulch, near southwest end of the Ruby range, 15 miles southeast of Dillon, Beaverhead county. The U. S. G. S. says development has not proceeded far enough to prove the existence of large deposits, but the prospecting done proves that considerable graphite, all of very high grade, occurs there. In another report says this deposit of the same type as the famous crystalline deposits of Ceylon. One mine producing. Also reported by Rowe three miles from Toston, Broadwater county.

GYPSUM

Uses—Wall plaster, gypsum plaster board, tile and bricks, insulating medium, retarder in Portland cement, fertilizer, blackboard crayon, base for paints, filler for cotton and most of the finer grades of paper, as a base for mixing with Paris green and other insecticides.

Occurrence—Cascade county near Millegan, Riceville, Goodman and Kibbey, in beds 3 to 6 feet thick. Fergus county, along north side of Little Belt Mountains, around the Big Snowy Mountains, encircling small dome near Hanover and probably encircling other structural domes, in beds 8 to 30 feet thick. In Jefferson county near Lime Spur. Carbon county, field extending from Bridger canyon southeasterly into Wyoming. Little explored. Beds 15 to 20 feet thick. Big Horn county in the Red Valley, west of Lodge Grass Creek, three beds, 6, 60 and 50 feet thick. Madison county, two beds near Lyon, 10 to 20 feet thick. Park county, near Hunter's Hot Springs, occurs in veins 1 to 5 feet wide.

ICELAND SPAR

Uses—For optical purposes, especially in instruments for polarizing light.

Occurrence—In Sweet Grass and Park counties.

KAOLIN

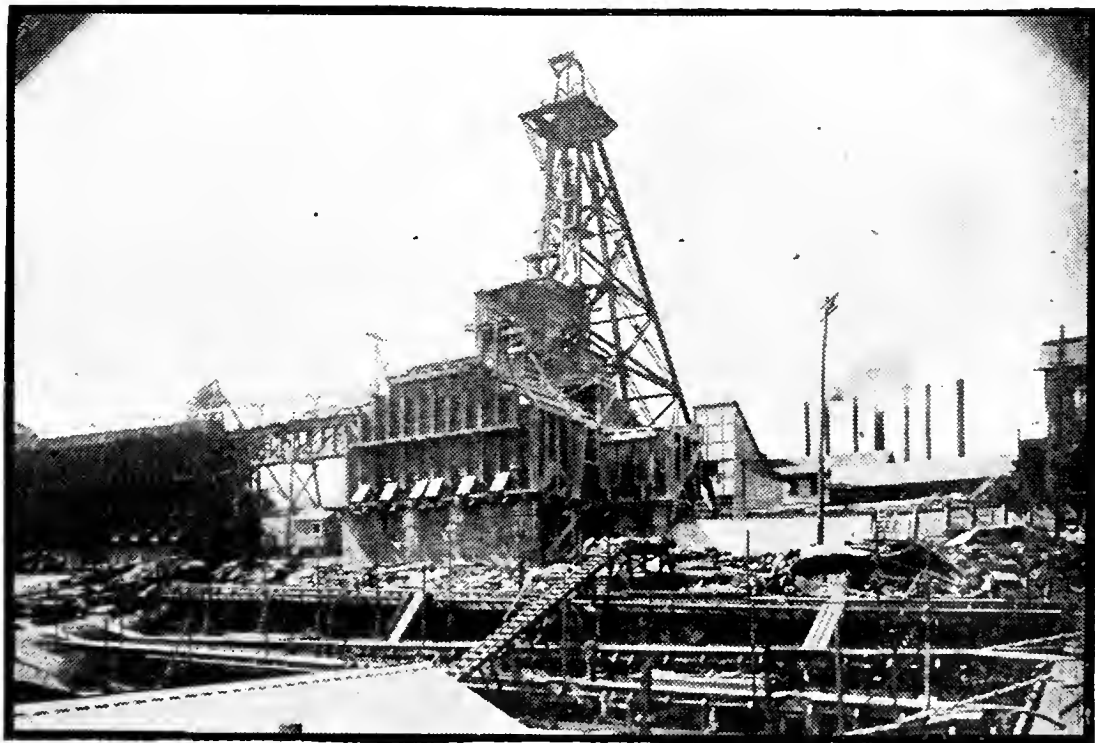
Uses—Extensively used in manufacture of porcelain.

Occurrence—Reported found in Fallon county.

LIMESTONE

Uses—The most generally useful sedimentary rock. As building stones. As practically the only source of lime and indispensable in cement manufacture. As fluxing material in smelting industry. A pure limestone is extensively used in sugar-refining. A fine, compact, homogeneous limestone, which may be either a pure carbonate of lime or dolomitic, is used as lithographic stone. It is found, of a quality suitable for lithographic work, at only a few localities. Two classes are known to the trade, the "blue" or hard stone, adapted to engraving and the better grade of fine-line printing; and the "yellow" or soft stone, which is rated as somewhat inferior.

There are many different kinds of limestone. The kind most suitable for one industry may be the least adapted to another industry. For Portland cement an argillaceous (clay) limestone which contains lime, silica, and alumina, in such proportions that in the finished cement the ratio of lime to the silica, alumina and iron oxide taken



A Butte Mine Hoist, Ore Bins and Precipitation Plant.

together shall be not less than 1.6 to 1, or more than 2.3 to 1, is most desired. For every ton of limestone used in manufacturing industries, three tons are used as furnace flux.

Occurrence—This rock is abundant in the mountainous parts of the state. Its principal use up to the present time has been as a furnace flux in the smelters and in the manufacture of lime. The increased use of stucco for plaster has reduced the market for lime and kilns in a number of districts are idle. According to Rowe there are many deposits of good limestone in the state, but most of them are too remote from the railroads to permit profitable operation.

Rowe reports limestone in Lewis and Clark, Powell, Cascade, Fergus, Carbon, Beaverhead, Silver Bow, Jefferson, Sweet Grass, Gallatin, Park and Deer Lodge counties.

MICA

Uses—Indispensable in electrical industry as insulating material, in wireless apparatus, in magnetos. Also used in stove fronts, chimneys and lamp shades and sounding boxes of phonographs. Asserted the enormous expansion of the electrical industry due in large part to the unique properties of mica. To be of value as sheet deposits must yield a rectangle at least $1\frac{1}{2}$ by 2 inches, which must split readily, be free from cracks, corrugations, etc. The only commercially valuable varieties in the United States are muscovite (common) and biotite (black mica).

Occurrence—U. S. G. S. quotes report of prospect eight miles southeast of Dillon, Beaverhead county, that is said to have yielded plates $8\frac{1}{4}$ by $18\frac{3}{4}$ inches. Another prospect was reported near Barker, Cascade county, in a bed four feet thick. Also reported on Granite Creek, between Virginia City and Sheridan, Madison county. Mica said to be of good quality, clear and well grained. Also reported on property of Zonolite Mining Company, near Libby, Lincoln county.

NITRATE

Uses—Chiefly as fertilizer and in manufacture of explosives.

Occurrence—U. S. G. S. reports deposit of niter along face of cliffs of black limestone, on Camp Creek, three and one-half miles northeast of Melrose, Madison county. No explorations to determine if potash and soda nitrates are included in the limestone back from the outcrop. Estimated would require 35 tons of rock to be treated to obtain one ton of crude salts.

OIL SHALE

Uses—Source of power, light and lubricants, and, when it is a phosphatic oil shale, as in southern Montana, is a source of fertilizer.

Occurrence—Dillon-Dell area, Beaverhead county, richest beds of phosphatic shale, 3 feet or more in thickness, yielded 25 to 30 gallons of oil to the ton. The United States Geological Survey, in its report on this field, says scant encouragement can be given the hope that the shale of this area can be successfully exploited for its oil yield. . . . It adds, however, that if on further investigation the merits of "Tetraphosphate," a fertilizer manufactured in Italy, are established, "the process could readily be carried on in conjunction with the distillation of the oil shales in the Dillon-Dell area."

PHOSPHATE

Uses—In largest quantity as ingredient of artificial fertilizers, finely ground, directly as a fertilizer, also used for making phosphoric acid and phosphorus. Phosphorus used in phosphor bronze, phosphor copper and phosphor tin, in incendiary bullets, smoke screens, matches, and striking surface on boxes of safety matches.

Occurrence—Reported by the U. S. G. S. in Granite, Powell, Lewis and Clark, Beaverhead and Jefferson counties. Detailed reports have been made on all of these deposits except the one near Cardwell, in Jefferson county. They show the deposits examined are workable and high grade, containing 60 per cent or more tricalcium phosphate. The deposits are easily accessible from Maxville, Garrison, Elliston and Melrose, at a distance of one to six miles from the railway. The Montana deposits, with those found in Idaho, Utah and Wyoming, constitute the largest phosphate beds in the world, so far as known. They are of a higher grade than those found in Florida and South Carolina which have been the principal source of phosphate in this country up to the present time. The U. S. G. S. estimates there are nearly six billion tons of high grade phosphate available in the United States of which five and a half billion tons are found in Montana, Idaho, Utah and Wyoming.

SLATE

Uses—About three-fourths of the slate produced in this country is for roofing purposes. Mill stock includes blackboards, flooring, wainscoting, mantels, hearths, switchboards, vats, sinks, laundry tubs, sanitary ware, grave vaults, tops for laboratory, billiard and kitchen tables. Waste is used for road material and flagging. Slate veneer, a built-up material, recommended for roofing.

Occurrence—Four miles east of Mitchell, Lewis and Clark county. Some development has been done on this deposit and machinery installed for making shingles, blackboards, switchboards, table tops and other flat work.

SOAPSTONE

Uses—The most generally known use is in hot-cake griddles. An ingredient of some lubricants, and utilized in a variety of other ways.

Occurrence—Reported by Rowe in a coal mine four miles southeast of Gilt Edge, Fergus county, and in a coal mine seven miles from Forsyth, on Smith Creek, Rosebud county. Bed four feet in thickness reported by U. S. G. S. in coal mine at Aldridge, Park county.

SULPHUR

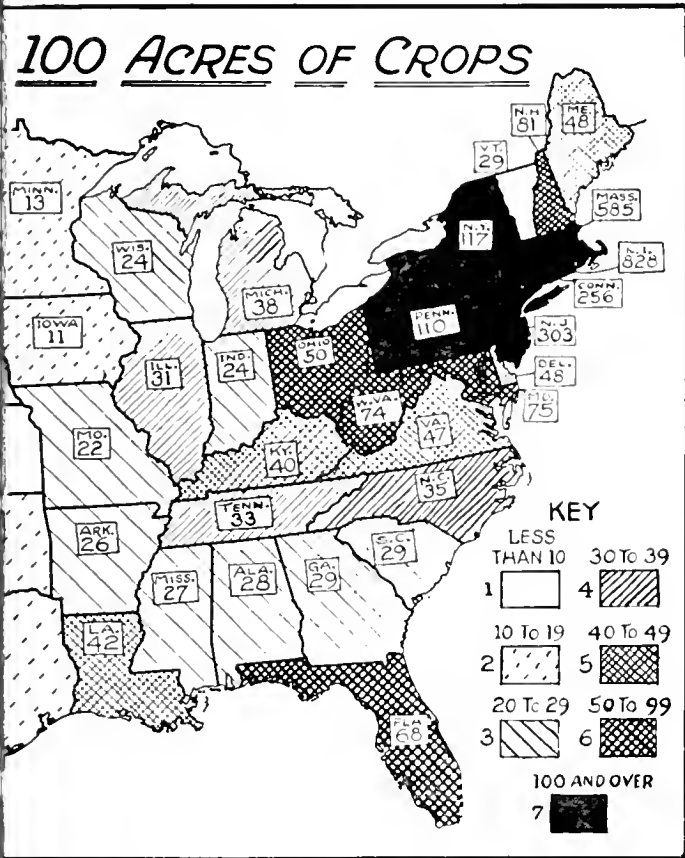
Uses—In making sulphuric acid and paper pulp, as a fungicide or insecticide in agriculture, and in certain explosive powders. More than half the total production converted into sulphuric acid which is used in fertilizers in refining petroleum, in pickling and galvanizing steel, and in making chemicals and drugs.

Occurrence—As a by-product from the smelters in Deer Lodge and Lewis and Clark counties.

ZONOLITE—See chapter on Mining in Montana.

FORESTRY RESOURCES—See chapter on Lumbering in Montana.

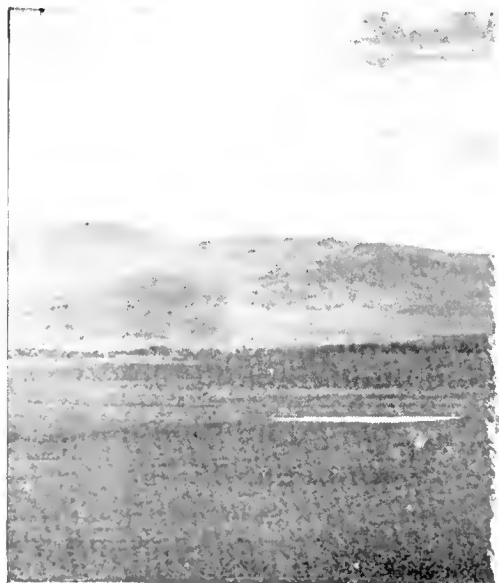
100 ACRES OF CROPS



—and a few
Treasure State F

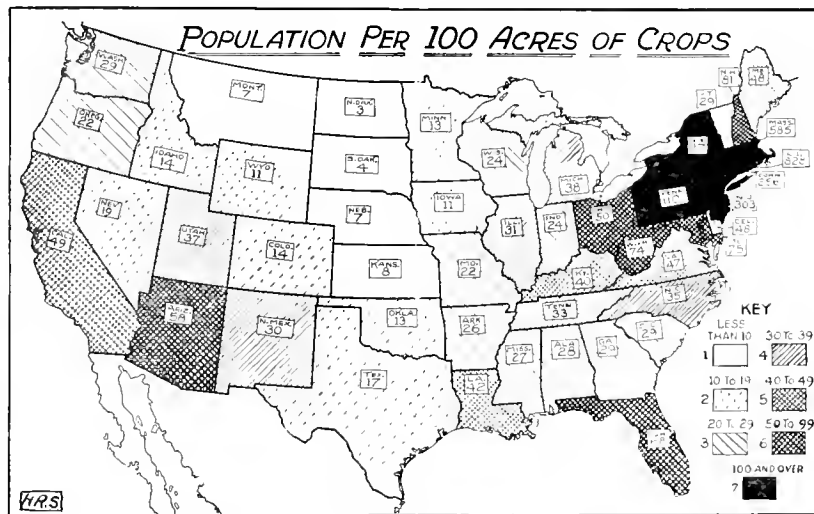
phy by H. R. Smalley.

ke, Western Montana





GREAT FALLS REDUCTION DEPARTMENT of the Anaconda Copper Mining Company. Located at Great Falls, Montana, on the Missouri River. Employs 2000 men. Equipped for copper refining, copper rod, wire and cable manufacture, electrolytic zinc production and the making of ferro-manganese.



From Economic Geography by H. R. Smalley.

Polson on Flathead Lake, Western Montana



—and a few
Treasure State Farms



arms



Industrial Montana

Industrial Montana today is taking a portion of the State's hogs and cattle, her crude oil, her wheat and timber, her coal and copper, her lead and zinc and fashioning these raw products into finished articles ready for consumption by a civilized society.

The Treasure State today makes brass, bronze and other metal products; cement, bricks, butter, and bread; sugar, flour, confectionery and soft drinks; finished lumber, saddlery and harness; meat packing, job printing products, and railroad cars.

Industrial Montana of tomorrow will take a portion of the State's iron ore and coal, her limestone, chromite and manganese and make steel. Her straw and wood pulp will be in part sent to the market as newsprint, wrapping paper, etc. Her sand and limestone, her kaolin and lead and natural gas will be used in the production of glass and pottery. Her linseed oil and barite, her lead and zinc will go into paint making; her phosphate, nitrate and sulphuric acid into fertilizers.

Montana's industrial progress in the past justifies the above prediction. In 1909 we had but 677 factories. Goods valued at \$73,272,000 were produced. Ten years later our plants numbered 1,290 and made goods worth \$166,665,000. In 1925 the value of products has been estimated at over \$200,000,000 and the number of establishments at 1,550. Of this it has been estimated that \$51,500,000 is the value added by manufacturers to raw materials.

On the ensuing pages there will be found enumerated and briefly described a few of the better known members of the State's young and vigorous industrial family.

DEVELOPED AND POTENTIAL WATER POWER IN THE UNITED STATES.

(From Report of U. S. Department of Interior—Geological Survey—1925.)

Developed Water Power Resources.

States	No. of Plants	Capacity in H. P. March 1, 1925
United States		10,037,655
1. New York	528	1,713,551
2. California	148	1,531,480
3. Washington	72	560,693
4. North Carolina		534,600
5. South Carolina		507,215
6. Maine	252	476,627
7. Wisconsin	156	412,715
8. Georgia	53	394,794
9. MONTANA	30	360,040
10. Massachusetts	347	344,439

Potential Water Power Resources.

Available 90% of the Time.

States	Horsepower	Per Cent
United States	34,818,000	100.00
1. Washington	4,970,000	14.27
2. California	4,603,000	13.22
3. New York	4,010,000	11.52
4. Oregon	3,665,000	10.53
5. Arizona	2,759,000	7.92
6. MONTANA	2,550,000	7.32
7. Idaho	2,122,000	6.10
8. Utah	1,420,000	4.08
9. Colorado	765,000	2.20
10. Wyoming	704,000	2.02

Available 50% of the Time.

States	Horsepower	Per Cent
United States	55,030,000	100.00
1. Washington	7,871,000	14.30
2. Oregon	6,715,000	12.20
3. California	6,674,000	12.13
4. New York	4,960,000	9.03
5. Idaho	4,032,000	7.33
6. MONTANA	3,700,000	6.72
7. Arizona	2,887,000	5.25
8. Utah	1,586,000	2.88
9. Colorado	1,570,000	2.85
10. Wyoming	1,182,000	2.15

WATER POWER RESOURCES



Total of 360,000 Horsepower Developed—More Than Two Million Horsepower Still Available for Development.



The potential water power of the 48 states of the Union totals 34,818,000 horsepower. Of this amount, 2,550,000 horsepower is in the State of Montana—an amount exceeded only by the states of Washington, California, New York, Oregon, and Arizona. Just 7.32% of the nation's water power resources are located within the borders of the Treasure State.

In Montana rise the two greatest rivers in the United States—the Missouri, which originates on the eastern, and the Columbia, which flows from the western slope of the Rocky Mountains. During their flow through the State, the Missouri falls approximately 2,000 feet before it crosses the eastern boundary, and the Clark's Fork of the Columbia, from the headwaters of its tributary streams, falls 1,000 feet before crossing the State line on the west. These great rivers, fed by innumerable tributaries, offer practically limitless opportunities for the economical development of hydro-electric power.

History shows that such development has more than kept pace with the growth of population and the demands of a state that is as yet industrially young. From 1912 to 1925, the population of Montana increased approximately 50 per cent. During the same period water power development in the State increased from 98,000 to 360,000 horsepower, an increase of more than 250 per cent.

Fourteen Companies.

This total of 360,000 horsepower has been developed and is now being distributed by a dozen or so private companies, operating in the central and western parts of the State. Although the Montana Power Company is the largest of these operators, it by no means constitutes a monopoly of the potential water powers of the State. Its total holdings, including 313,000 developed and 120,000 undeveloped, make a grand total of 433,000 horsepower. Deducting even this comparatively large figure from the State's total water power capacity of 2,550,000 horsepower, there still remains 2,117,000 horsepower available for others. In other words, there is 84 per cent of the State's potential water power over which this company exercises no control whatever.

Early Developments.

The first water power plant of importance in the State was built on the Black Eagle Falls on the Missouri River, near the city of Great Falls, in 1891. It had a capacity of 8,000 horsepower and supplied power to the Boston and Montana smelter, which was located on one side of the river near the Falls, and to the city of Great Falls, located on the other side of the river. To replace this pioneer plant, a million-dollar project, generating 25,000 horsepower, is now under construction.

In 1908, plants were built at Canyon Ferry on the Missouri River, 17 miles from Helena, and on the Big Hole River, 21 miles from Butte.

These three early plants, supplying power respectively to Great Falls, Helena, and Butte, and built at a time when the transmission of power by electricity was in

its infancy, formed the nucleus of the Montana Power Company's system, which has now become one of the great power systems of the country.

In the following years, additional plants were built on the Missouri River at Hanser Lake, Holter, and at Great Falls, on the Madison River near Norris, on the Columbia at Thompson Falls, and on the Yellowstone River at Livingston and Billings, and last of all, on the West Rosebud Creek, at Mystic Lake. The combined capacity of all these plants now amounts to more than 300,000 horsepower. These plants are all interconnected by a network of high voltage transmission lines, totaling over 2,200 miles in length.

Pioneering in Power.

When Lewis and Clark discovered the Great Falls of the Missouri in 1805, they described them in their immortal journal as "one of the grandest sights in nature." For 104 years they remained just that and nothing more.

For 25 years or, in other words, during the entire time that the Great Falls site was owned by James J. Hill and his associates, development of this great water power had been talked of and hoped for. Yet during all that time the Falls remained in the same state that Lewis and Clark had found them. Then came a Montanan, John D. Ryan, who, with his associates, organized the Montana Power Company. Development began at once.

Capital Supplied.

What were the capital requirements?

The promoters found themselves possessed of a site along the bank of a river whose maximum flow in flood seasons was 120,000 cubic feet a second and whose minimum flow was but 2,000 cubic feet a second. It was, therefore, obvious that the annual flow would have to be evened up and the minimum flow raised to at least 5,000 cubic feet a second, since the company could sell only the amount of power that could be produced at the lowest flow of the river. This meant the building of large and expensive dams and reservoirs to furnish head for the water wheels, hold back the floods and increase the stream in dry seasons. Besides dams and reservoirs, generating plants had to be built and equipped. To transmit the power generated at these plants to customers scattered over a territory 300 miles square—an area of one and one-half times that of New England—the company has had to build 2,000 miles of high tension lines, together with 75 sub-stations and distributing systems. Other items of expenditure for physical properties have brought the company's total investment in this State to more than \$40,000,000.

Had to Find Money.

But these hydro-electric pioneers not only had to find the money with which adequately to develop this power, they had to create a market for it. Montana was and is still very largely a stock raising, lumbering and agricultural community, with little demand for power in appreciable quantities. There was, however, one peg upon which these promoters hung their hope of success. The great mining camp of Butte and the smelters of Anaconda and Great Falls were using large quantities of power generated by steam. Here was a potential market worth capturing. And when the Montana Power Company originally offered to replace 75,000 horsepower, generated by steam at a cost of \$125 per year per horsepower, with 75,000 horsepower of hydroelectric energy supplied at a cost of \$35 to \$50, the result was a foregone conclusion. Contracts were executed, installations were made, and from that day to this the mining companies of Montana have been making a saving in their power bills of millions of dollars a year.

This saving has very largely, in fact, almost entirely gone to the people of Montana. The mining companies have devoted that much more money to the development



A Potential Power Site.

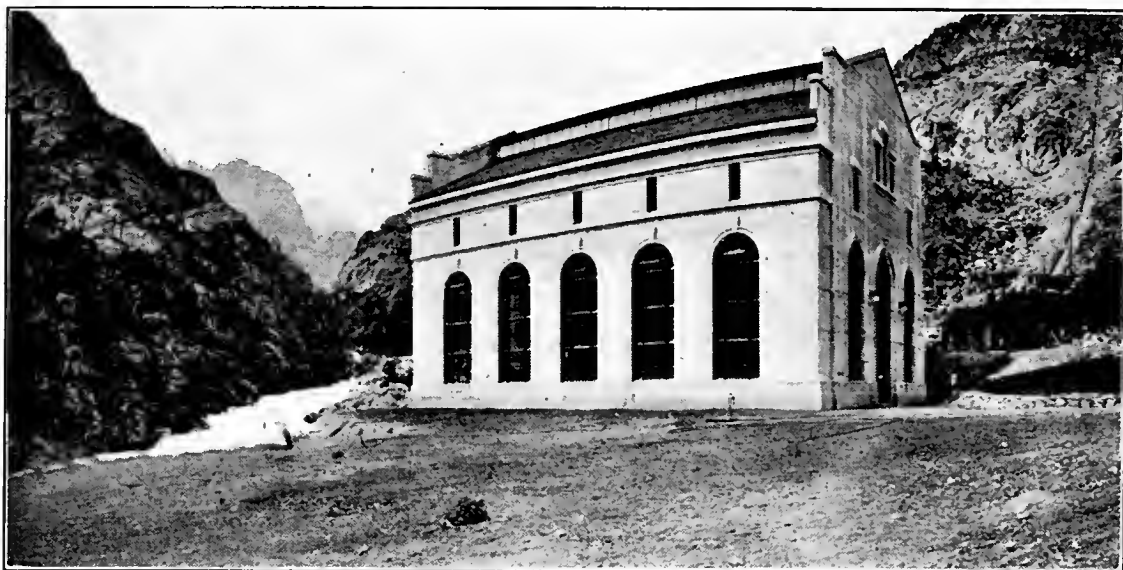
of their mineral resources and to the extraction and treatment of ores carrying proportionately less value. It works this way: Let us say, for instance, that today hydroelectric power saves the Anaconda Copper Mining Company \$2,000,000 a year and that company produces and treats 4,000,000 tons of ore a year. Here is a saving of 50 cents a ton made in its operations. This saving enables the company to mine ore averaging six pounds less of copper per ton than it could otherwise have mined at a profit. And it increases enormously the tonnage of commercial ore which otherwise would have to be rejected and which, owing to mining conditions, would be lost forever. This feat of making commercially available millions of tons of ore that could not otherwise be extracted at a profit makes for the permanency of Butte, the prosperity of its people, and the safety and assurance of every business enterprise in the State directly or indirectly dependent on the mining and reduction of ores.

To Transportation.

Later on came the application of hydroelectric power to transportation. The Butte, Anaconda & Pacific was the first road in America to substitute electricity for steam locomotives in handling heavy railway traffic. So pronounced was its success that the Chicago, Milwaukee & St. Paul followed its example, with the result that today Montana, with its 530 miles of trunk line installation, leads the nation in electrified steam railroads.

Gradually other infant industries were born and grew to robust stature very largely because of the availability of cheap hydroelectric power. Street railways, cement and flour mills, creameries and ice-making plants, and hundreds of smaller establishments requiring electrical energy and located in 77 cities and towns of the State are now served by this company.

Hydroelectric power has made industrial Montana a little world of its own, which employs more than 20,000 factory hands, who annually contribute to the raw materials handled an added value of \$51,500,000.



Mystic Lake Plant of Montana Power Company Developing 15,000 Horsepower.

Conserving Resources.

So much for the direct, definite benefits of hydroelectric development to industry. What of its effect in helping to conserve two of the other great resources of the state—coal and oil?

The present annual output of hydroelectric energy in the United States represents the equivalent of 40,000,000 tons of coal, or one-tenth of the 400,000,000 tons which the nation burns up every year in producing steam and electric power. The water power resources of this country so far developed are roughly 20 per cent of the total amount available. So that it is evident that there is enough undeveloped water power in the United States today which, if developed, would take the place of every ton of coal now consumed purely for power purposes.

To bring this condition nearer home, the Montana Power Company's yearly output of hydroelectric energy is the equivalent of more than 2,000,000 tons of coal a year, or 5,500 tons every 24 hours. This is more than 60 per cent of all the coal mined in Montana each year.

Also while coal and petroleum are both actually destroyed when being transformed into power, water power is never destructively consumed. It constantly reappears in all its original vigor, and this saving, once accomplished, is perpetual. For example, the Montana Power Company takes a drop of water away up on the Madison, turns it into power, passes it on to other plants lower down which, in turn, repeat the performance until, by the time it escapes from the tail race at the Great Falls of the Missouri, it has been converted into commercial power no less than eight times at as many different plants and is still ready to do its full share in helping to bear the great flotillas of commerce along the Missouri and the Mississippi, from St. Louis to the gulf.

Cheaper Than Steam.

As for the economy and cheapness of hydroelectric service in comparison with coal or oil, no more startling proof can be afforded than the spectacle of every coal mine in Montana conducting its operations solely by electric energy purchased from the Montana Power Company at regular, published rates because this is actually cheaper than to use steam generated by coal from its own mine.

The development of water power in Montana means the saving of seven tons of coal per year for every horsepower produced. It means the distribution of

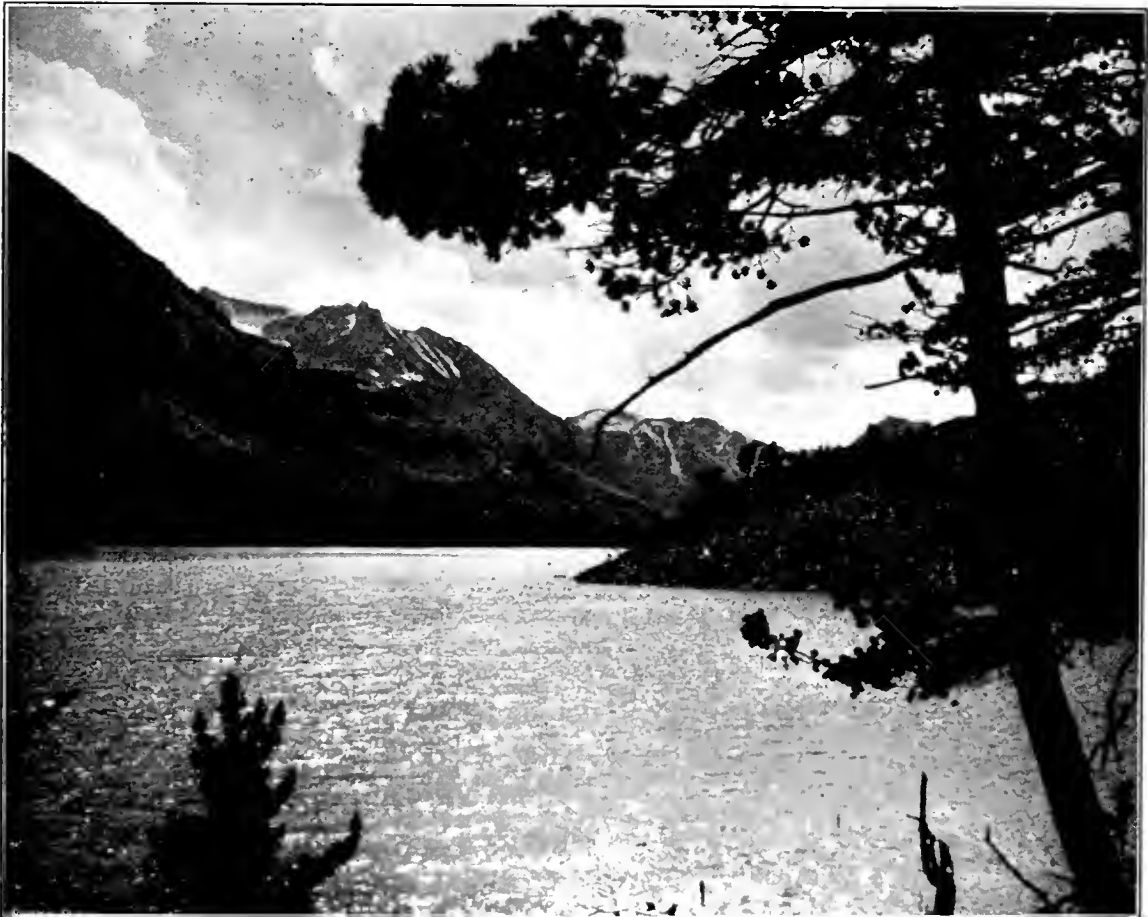
power to places where the use of coal would be very costly. It means the supplying of power where coal could not be used. The development of every water power site is exactly equal to the discovery of a new coal supply of the same potentiality, without the necessity of operating a mine to take it out, or the building of a railroad to carry it to market.

In place of the mine and the railroad, water power development means the construction of dams and reservoirs and penstocks which direct its energy against machines which in turn actuate electric generators, whose product may be sent over wires through the countryside to the cities and villages, to turn their machines, light their streets, operate their car lines, supply their doctors and dentists with power for their X-ray and other instruments, to run the housewife's washing and sewing machines, flat irons, dishwashers and refrigerators, to operate the elevators of office buildings and apartment houses, to run the coffee mills and meat slicers in the stores, to make marcel waves in milady's hair, to put soles and heels on shoes and to turn cream and milk into butter and cheese—in other words, to do the thousand and one things which were formerly left undone or were produced only at the expense of hard, manual toil.

Utilization of Power.

The largest single power consuming industry in the State is metal mining and reduction. The plants of the Anaconda Copper Mining Company and other mining and smelting companies in Butte, Anaconda, East Helena, and Great Falls consume over 130,000 horsepower.

The next largest class of power users are the electrified railways, which take some 50,000 horsepower.



Mystic Lake, Stillwater County.



The Beautiful Yellowstone Canyon.

In addition to these, large amounts of power are used for mining coal at the mines at Red Lodge, Bear Creek, Roundup, Sand Coulee, and Stockett.

An interesting development along this line is the recently developed open pit strip mine of the Northern Pacific Railway Company at Colstrip, Montana, 100 miles east of Billings. At this point there is a single vein of coal 28 feet thick, which lies about 20 or 30 feet below the surface. This coal is being mined with enormous electric shovels, and is used by the Northern Pacific Railway for the operation of several hundred miles of its main line.

A survey of this coal bed indicates that there are 150,000,000 tons of coal, having less than 100 feet over-burden, which can be obtained by stripping, and 90,000,000 tons at greater depth which can be obtained by mining. Electric power is used exclusively for carrying on this mining operation, it having been found far more economical than the use of steam power.

Power is used in considerable quantities for pumping water, both for irrigation and for city water supply. The city water supply for Butte is largely provided by pumping from the Big Hole River with electric power, and the cities of Billings, Livingston, Great Falls, and several smaller towns are entirely dependent upon electric power for their water supply. About 4,000 horsepower is used in the Prickly Pear Valley for irrigation, and large amounts are used in the vicinity of Billings and Great Falls for the same purpose. Electric power is used throughout the State for the operation of grain elevators, flour mills, and a considerable amount is taken by the sugar factories at Billings and at Chinook.

Vast Reservoirs.

It is of interest to note the relation of water power development to irrigation. Some years ago the waters of the upper Madison were impounded by means of a dam erected at great expense by private capital. Obviously this construction was

authorized because the company wished to make available during the possible seasons of drought a vast reservoir of water which could be drawn upon to operate its plants on the Madison and the Missouri. Such a need came in 1919, when extremely low water made it necessary not only to tap this reservoir but to drain it practically dry in order to keep the plants running and the industries of the State in operation.

Incidentally, however, this reservoir supply, created through the foresight of private capital, turned out to be a Godsend to hundreds of farmers along the stream who were enabled to divert these impounded waters to the ditches of their irrigated farms, which otherwise would have had nothing to report but total crop failures. Thus in a very practical way an identity of interest was demonstrated between hydroelectric power development and irrigated farming.

Another feature of interest to the farmer is the use of hydroelectric energy to lift the water onto the land where irrigation by gravity ditches is impossible or impracticable. During the last ten years Montana has developed a system of irrigation by electrically driven pumps, of which there are now more than 250 in use in this State. These projects use varying amounts, ranging from 5 to 3,600 horsepower. All told, they are capable of irrigating 37,000 acres of land.

Of the several irrigating pumping districts, the oldest and best known is the Prickly Pear irrigation project, near Helena, where farmers purchase water pumped to their lands at a low contract price. At Plains, Montana, is another project comprising 2,700 acres to which water is pumped electrically from wells.

Can Be Irrigated.

Montana has more than 2,250,000 acres of land susceptible to irrigation by pumping. If the experience of California, Utah, and



Lower, Black Eagle Dam, Great Falls. Oval, Bonner Power House.

other western states is to be repeated here, where we have an abundance of electric power available at a low price, irrigation by electrically operated pumping plants will undoubtedly outstrip the development of irrigation by gravity ditches in the very near future. And here again will be demonstrated a further community of interest between the agricultural and the hydroelectric enterprises of the State.

Electricity is rapidly being extended to the homes of farmers, whose wives are finding their household work much easier and the home more attractive to the young folks.

Domestic Uses of Electric Power.

At the present time, the Montana Power Company has 43,000 lighting customers, 4,800 electric range customers, and 2,000 power customers. The average consumption of electric energy in a home amounts to 32 kilowatt hours per month, which at present rates costs \$2.28.

Fifteen years ago the average domestic consumer used 14 kilowatt hours per month and had practically the same monthly bill. Fifteen years ago the average customer had 10 or 12 16-candle power lamps and very little else in the way of electrical equipment. Today the modern home is equipped with lamps running from 25 to 200 candle power which, due to improvements in the lamps themselves, take no more power than the old 16-candle power lamps.

In addition, we have the electric range, the electric water heater, washing machine, ironer, vacuum cleaner, coffee percolator, toaster, curling iron, waffle iron, egg beater, radiant heater, and last, but not least, the electric refrigerator.

UNDEVELOPED HORSEPOWER PRACTICAL FOR ECONOMIC DEVELOPMENT

The following table shows the undeveloped horsepower in various Montana Counties that is at present practicable for economic development:

County	Developed Horsepower	Undeveloped Horsepower
Big Horn	0	100,000
Cascade	131,000	93,000
Custer	0	5,000
Flathead	4,000	274,000
Lewis and Clark	101,000	20,000
Lincoln	0	20,000
Madison	12,000	20,000
Mineral	0	20,000
Missoula	3,000	0
Park	2,000	5,000
Sanders	47,000	198,000
Stillwater	15,000	15,000

FOREST RESOURCES AND LUMBER INDUSTRY*



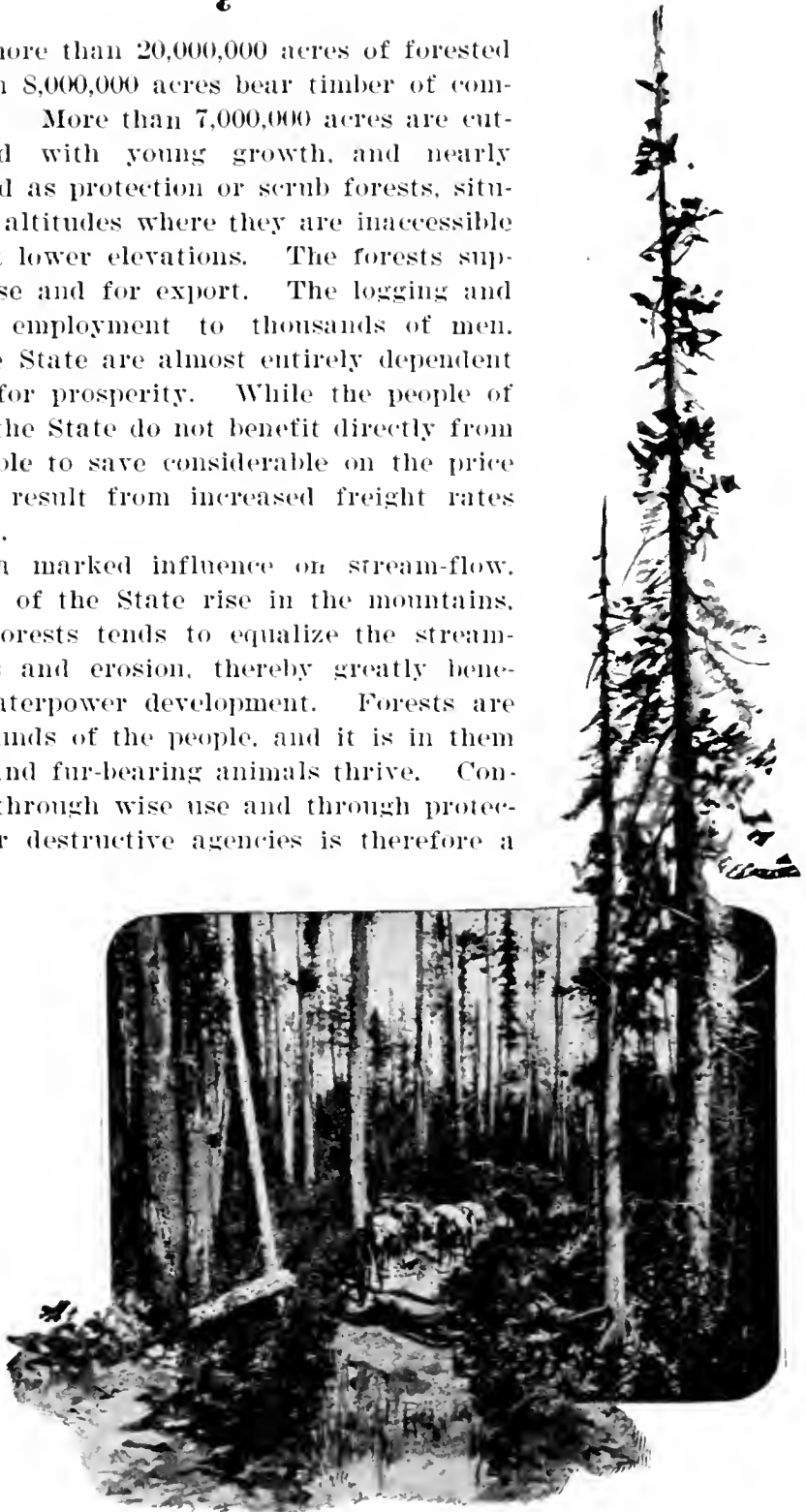
Direct and Indirect Benefits Are Incalculable—Federal Government, State and Private Owners Share in Task of Forest Protection.



The State contains more than 20,000,000 acres of forested land, of which more than 8,000,000 acres bear timber of commercial size and quality. More than 7,000,000 acres are cut-over, burned or covered with young growth, and nearly 5,000,000 acres are classed as protection or scrub forests, situated either in the higher altitudes where they are inaccessible or on the poorer sites at lower elevations. The forests supply material for home use and for export. The logging and milling of timber gives employment to thousands of men. Many communities in the State are almost entirely dependent on the lumber industry for prosperity. While the people of the non-forested part of the State do not benefit directly from the industry, they are able to save considerable on the price of lumber which would result from increased freight rates from more distant points.

Forests also exert a marked influence on stream-flow. Most of the great rivers of the State rise in the mountains, where the presence of forests tends to equalize the stream-flow and prevent floods and erosion, thereby greatly benefiting irrigation and waterpower development. Forests are also the natural playgrounds of the people, and it is in them that the game and fish and fur-bearing animals thrive. Conservation of the forests through wise use and through protection from fire and other destructive agencies is therefore a matter of common interest to every citizen.

The most important commercial species are western yellow pine, western larch, Douglas fir and lodgepole pine. Other species of commercial quality but rather limited distribution are Engelmann spruce, western red cedar, western white pine, lowland white fir and western hemlock. Limber pine, whitebark pine, alpine fir, alpine larch, mountain hem-



A Mountain Trail.

*Data by State and Federal Forest Service.

lock and juniper commonly grow in the very high altitudes, and are of such scrubby or irregular form as to be of little value except for fuel. They are, however, of great value for watershed protection.

Western yellow pine is the most widely distributed of all the forest trees. It commonly grows at the lower elevations along the valleys, and at somewhat higher elevations on south slopes. It extends in a scattered growth to the bluffs and broken lands of the plains section, and forms the only species of consequence in the Custer National Forest, in southeastern Montana, from where it extends on into the Black Hills of South Dakota. It is a fine, straight-growing tree that produces lumber of excellent quality. It generally grows in rather open stands, with a ground cover free from brush. It is, therefore, less subject to destructive fires than are mixed stands.

Western larch is confined to the forests of the western slope, being most prevalent in the forests of the Flathead and Kootenai Rivers. It grows tall and straight, with a greater clear length than any other species in the region. Larch lumber is chiefly used in the form of timbers and for general construction purposes, but the high percentage of clear lumber which can be obtained from it makes it an excellent lumber for interior finish and flooring.

Douglas fir is rather widely distributed on all of the forests except those of the southeastern part of the State. It grows in mixture with yellow pine, larch, and other species, and is inclined to somewhat higher altitudes and moister situations than the yellow pine. The wood, being very strong and durable, fits it for use as heavy timbers and railroad ties. Douglas fir is not a true fir, nor is it a spruce. It is variously known by other names, such as Douglas spruce, red spruce, red fir, Oregon fir, etc. Its scientific name means false hemlock: yet it is not a hemlock. Along the Pacific coast it attains great size.

Lodgepole pine is found at the higher elevation in all of the forests of the State, especially along the Continental Divide and to the eastward toward the Yellowstone Park, where it is the principal commercial species. It is largely used for mine timbers, telephone poles and railroad ties. Owing to its generally small size it has not been cut extensively for saw timber. It is much used by farmers and ranchers of the State for fences and buildings.

Engelmann spruce inclines to canyon bottoms and moist situations in the higher elevations. The principal bodies of spruce occur in the northern part of the State in the Blackfoot and Kootenai National Forests, although it is found in all National Forests except the Custer, in the southeastern part of the State.

Western red cedar, or *arbor vitae*, is found only in the extreme western part of the State, where it sometimes forms a considerable portion of stands along with Douglas fir, larch and white pine. It reaches the greatest size of any tree native to the State. It is especially valuable for telephone and transmission line poles, fence posts and shingles.

The western white pine of Montana is a part of the largest body of white pine timber remaining in the United States, the bulk of which lies in northern Idaho and eastern Washington. It is found largely in the forests along the Idaho boundary, but extends eastward into the Flathead and Swan Rivers, and occurs sparsely in the canyons to the west of the Bitter Root River. It is the finest lumber tree of the State, and its reproduction is being encouraged wherever possible on the National Forests.

The lowland white fir is found to a limited extent at the lower elevations in the extreme western part of the State, the main bodies lying still farther to the westward. It grows tall and straight, and makes a fair quality of lumber.

Western hemlock is also confined to the extreme western part of the State, where it grows in mixture with white pine and western cedar. As it reaches



Flathead Lake.

maturity it inclines to defect, which makes it unpopular as a lumber tree. When sound, however, it makes a fair grade of lumber, and is more and more coming into use in connection with the harvesting of other species.

Alpine fir grows in the higher elevations in all of the forest regions. It is used

to a slight extent for lumber, but is more valuable for paper pulp, for which use it has not so far been cut to any great extent in the State.

Whitebark pine and limber pine are of the white pine family. They commonly grow at the higher altitudes and on rocky soils. Limber pine sometimes extends down to the lower limits of timber, as in the Belt Mountains. It is not found to any great extent west of the Continental Divide.

Alpine larch and mountain hemlock are of rather infrequent occurrence, and are limited to the mountains west of the Continental Divide.

OWNERSHIP

TABLE 1

Area of Forest Land

Ownership	Acres Commercial Size and Quality	Acres Young Growth Burned and Cut-Over	Acres Protection and Scrub Forest
Private	1,882,000	1,174,000	1,351,000
State	288,000	116,000	43,000
National Forest.....	5,313,000	5,559,000	2,403,000
°Other Federal	859,000	575,000	1,059,000
Total—Acres	8,342,000	7,424,000	4,856,000
Total Timbered—Acres			20,622,000
Total Commercial and Young Growth—Acres.....			15,766,000

°Includes Indian and Military Reservations and National Parks.

Lumber Production and Consumption.

The average annual lumber cut for the five-year period 1920 to 1924 in the State of Montana was 341,555,000 board feet. During the same period the total of all forest products, including mine timbers, ties, poles and miscellaneous material, amounted on an average to 480,240,000 board feet. Fifty-five per cent of the lumber cut and 64 per cent of all forest products came from private holdings, the rest being divided between State forests, National forests and other Federal lands, mainly Indian reservations. The estimated value of the average annual cut is \$14,350,000. For every thousand feet of forest products produced it is esti-

mated that approximately \$20 is spent locally for labor and supplies. The lumber industry thus creates local business to the extent of almost \$10,000,000.

The 1924 census shows that there are within the State 246 mills, of which 150 were active. The investment in manufacturing plants, lumber yards, etc., is about \$25,000,000, while an equal amount is invested in private timber lands and stumpage. The industry employs nearly 7,000 men.

There were in 1924, 315 retail lumber dealers in the State, and the figures indicate that the total consumption of all forest products in the State averages about 361,000,000 feet, of which 307,000,000 feet is produced within the State and 54,000,000 feet is imported. Fifty-seven per cent of the lumber, excluding sawed ties and mine timbers, is exported. Lumber forms one of the very large factors in the freight transportation business of the railroads, and balances a considerable portion of the State's bills for goods imported.

Of the timber imported, 35,000,000 feet comes from the Pacific coast, 17,000,000 feet from Idaho, and 2,000,000 feet of hard woods from the South.

While there are no accurate figures as to the amount of timber the forests can produce annually on a sustained yield basis, it seems safe to say that with the thought and effort that is being put into protection and management they should be able to continue to produce at the present rate of cutting, or approximately 500,000,000 feet a year, or at the rate of about 35 board feet per acre per year. Many of the older settled states cut out their timber at a very much faster rate than it was replaced by growth, with the result that the forest became practically exhausted. Many towns and communities were deserted, and the economic loss to the State, due to the migration of the lumber industry, has proved a serious blow to prosperity. It is gratifying to think that Montana has not so far cut her forests at a rate which has resulted in a depletion of the supply.

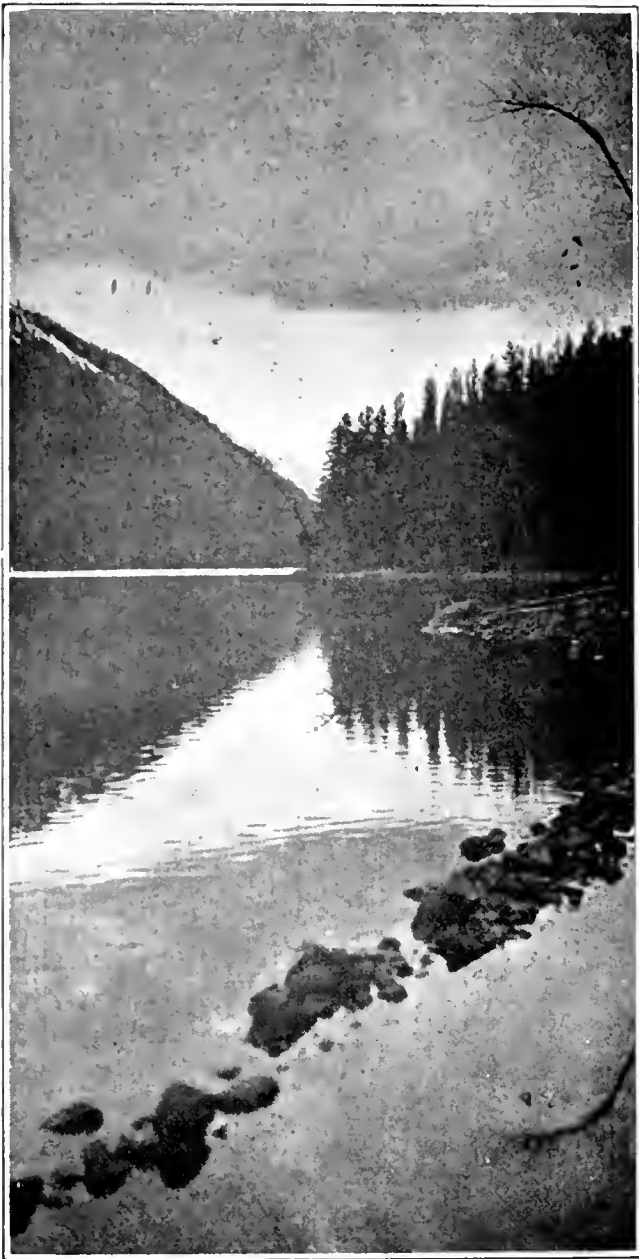
TABLE 3
Lumber Cut of Montana from 1870 to 1924.

1870	12,571,000	1913	357,974,000
1880	21,420,000	1914	317,842,000
1890	89,511,000	1915	328,000,000
1899	255,685,000	1916	383,900,000
1904	236,430,000	1917	350,000,000
1905	189,291,000	1918	340,000,000
1906	328,727,000	1919	287,378,000
1907	343,814,000	1920	410,000,000
1908	311,533,000	1921	213,989,000
1909	308,582,000	1922	304,383,000
1910	319,089,000	1923	427,634,000
1911	228,416,000	1924	351,403,000
1912	272,174,000	1925 (estimated value).....	\$14,350,000

MONTANA STATE FORESTS.

Montana owns more than half a million acres of State forest lands. They are comprised in seven State forests and many isolated State forest sections scattered throughout the State.

Stillwater State Forest	90,000 acres
Swan River State Forest	42,000 acres
Coal Creek State Forest	20,000 acres
Sula State Forest	10,000 acres
Thompson River State Forest	14,628 acres
Clearwater State Forest	18,076 acres
Lincoln State Forest	8,245 acres
Total of Established State Forests.....	203,949 acres
Forest Sections Scattered Throughout the State.....	363,000 acres
	566,949 acres



It is the policy to exchange these scattered State forest sections for forest areas contiguous or adjacent to any of the seven State forests named above. Since the State has definitely adopted a policy of State forest ownership, it has been necessary to enact constructive legislation for the use, management, control and disposition of the State forests. The Act of the Legislature of March 17, 1925, provides a substantial foundation for State forest management.

State Forest Lands Not for Sale.

State lands that are classified as forest lands and "which are principally valuable for the timber that is on them, or for the growing of timber, or for watershed protection, are designated State Forests, and reserved for forest production and watershed protection."

While the State forest lands are not for sale, products of the State forests are for sale. These products consist chiefly of timber and forage. This provision of law is very recent, but the State forests now serve 68 permittees, whose chief business is grazing. Also there are 50 large timber sales involving 87,000,000 feet located in five of the chief watersheds of the State. The State forests

furnish timber in small sales at nominal cost to 249 settlers and residents.

The receipts from Montana's State forests go entirely to the common schools and other educational institutions of the State.

State Forests Contribute to Industry.

Out of the 50 large sales now in operation, seven are to firms and lumber companies that are wholly dependent on State forest timber for their supply of logs. The balance of the operators are only partially dependent upon the State forests for their timber supply.

The amount of timber cut yearly on Montana's State forests is about 30,000,000 feet. Such a cut requires at least 300 laborers the year 'round. The timber cut from Montana State forests contributes more than half a million dollars annually to the industrial wealth of the State. Moreover, the receipts from the stumpage on sales of timber that go to the educational institutions of the State amount to about \$100,000 a year.



Loading on Cars at Railroad, Mineral County.

The seven State forests comprise some of the most natural and accessible recreational centers of the State. The Lincoln and Clearwater State forests embrace a large part of the Big Blackfoot River. These two forests are important centers of recreation for the cities of Helena, Butte, Great Falls, and Missoula. The Stillwater, Coal Creek and Swan River Forests are among the chief centers for Kalispell and Missoula. All of these State forests abound in game and fish, and it is safe to estimate that they are visited by thousands of Montana's citizens each year, as well as by many tourists.

THE NATIONAL FORESTS.

There are 17 National forests in the State. Names, areas and headquarters will be found in Table No. 4. Of the net area of Government land within the forests, 5,313,000 acres contain timber of merchantable size and quality, 2,403,000 acres are classed as protection forests, 5,559,000 are young growth, cut-over or burned, and the remainder consists of open land and barren land unsuited to timber production. The forests are situated almost entirely in the mountainous sections of the State, that is, the western and southern portions. The Custer Forest occupies a number of elevated mesas and buttes extending from the Tongue River eastward into South Dakota. Within the forests are most of the headwaters of the Clark's Fork of the Columbia, the Missouri, and the Yellowstone Rivers. The National forests are so situated as to be a direct factor in the welfare of the people over about half of the entire State, and comprising more than two-thirds of the State's population.

The National forests were created under Acts of Congress authorizing the withdrawal of public lands for the protection of stream-flow and the production of timber. They are therefore the property of the entire people, and under the policy



A MONTANA HIGHWAY
And a Few Views Along the Trail





SAW AND PLANING MILLS OF ANACONDA COPPER MINING COMPANY, BONNER, MONTANA THE UNIVERSITY OF MONTANA IS LOCATED AT MISSOULA, SEVEN MILES WEST.



Logs in Stillwater River, Near Olney, Montana.

of the Department of Agriculture are administered in such a way as to be of the greatest benefit to the greatest number in the long run. The National forests are directly in charge of the Forest Service, with headquarters at Washington, D. C. For the purpose of administration they are divided into eight groups, or districts. District 1 comprises the 17 National forests of Montana and 7 National forests of North Idaho, which are in charge of the District Forester whose headquarters are at Missoula. Each forest is in charge of a Supervisor, with headquarters at the most convenient location for the administration of his forest. The forest is again sub-divided into districts, each in charge of a forest ranger, who handles timber sales, grazing, fire protection and other work.

TABLE 4
Names, Headquarters and Net Area of National Forests of Montana

Forest	Headquarters	Net Area
Absaroka	Livingston	841,086 acres
Beartooth	Billings	659,919 acres
Beaverhead	Dillon	1,339,273 acres
Bitter Root	Hamilton	1,047,071 acres
Blackfeet	Kalispell	836,967 acres
Cabinet	Thompson Falls	829,077 acres
Custer	Miles City	517,267 acres
Deer Lodge	Butte	829,158 acres
Flathead	Kalispell	1,721,478 acres
Gallatin	Bozeman	575,189 acres
Helena	Helena	681,291 acres
Jefferson	Great Falls	1,040,636 acres
Kootenai	Libby	1,331,513 acres
Lewis and Clark.....	Choteau	810,731 acres
Lolo	Missoula	850,677 acres
Madison	Sheridan	931,020 acres
Missoula	Missoula	1,030,257 acres
Total		15,872,610 acres





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Forest Fires.

The protection of the forests from fire constitutes the most important work which the Rangers do. The control of fires, especially in the dense forests and underbrush such as is found in the extreme western part of the State, is very difficult. In that locality some seasons become very dry. The humidity of the air drops very low, and the material on the forest floor becomes highly inflammable. Lightning storms, accompanied with little or no rain, are frequent. High winds sometimes prevail. In spite of all efforts, therefore, forest fires sometimes get beyond control. This was notably true in the very dry seasons of 1910 and 1919, when large areas, both within the National forests and outside, were burned over.

Gradually the Forest Service has developed its organization to a point where it can better cope with the fire situation. Trails have been extended into the inaccessible regions. Lookouts have been established on the mountain peaks and telephone lines for communication have been built. This system of protection is also being extended to State and private lands, and it seems likely that fire losses will gradually become less colossal.

During the years 1908 to 1924, both inclusive, 3,329,000 acres of forest land were burned over, causing losses conservatively estimated at \$10,462,000. In addition the cost of fighting these fires was \$3,533,000. A total of 11,214 fires occurred in the period, of which 7,895, or 70 per cent, were man caused. The remainder were caused by lightning. The man caused fires are almost wholly due to carelessness, negligence or ignorance, and are really preventable. Most of them are in violation of the State laws which prohibit the careless, malicious or negligent handling of fire in the forests. Many of the violators of the forest-fire laws have been punished by the courts during the last five years, and there is a rather strong public sentiment against the careless use of fire in the forests.

Harvesting the Timber Crop.

The cutting of timber on the National forests is limited to the amount replaced by growth, so that the forest capacity will not be reduced. Cutting is restricted to mature timber or to thinnings that will result in increased growth or improvement of the stands. Timber is sold commercially to the highest bidder. Each tree is marked for cutting by a forest officer, and the logs are scaled or the pieces counted so that the purchaser pays for the exact amount of timber he receives. Sales are made to ranchers for their own use at the cost of administration. As rapidly as possible the forests are being divided up into working circles, for each of which an estimate of the stand and annual growth is made. The limitation of cut is then fixed, and an effort is made as rapidly as possible to place the timber within the circle on a sustained yield equal to its producing capacity. By this means permanent communities based on the lumber industry will be established and maintained, and the forest lands will be kept in the highest state of production.

Grazing of Livestock.

The National forests produce large crops of forage, which are used mainly by sheep and cattle. While the grazing of livestock was not one of the purposes for which the forests were created by Acts of Congress, it has proved to be one of the major uses of the forests. In 1925, 155,950 cattle and horses and 564,558 head of sheep were grazed on the National forests of Montana. All stock is grazed under permit, and except for the few head of work horses and milk cows allowed to be grazed free by actual settlers a fee is required for all stock. The receipts from grazing fees for 1925 amounted to \$133,785, of which 25 per cent was paid to

the State, to be distributed among the counties in which the National forests are situated and to be used for roads and schools.

Preference in the use of the range is given to prior users and to persons owning and residing on improved ranch property in or near the forests and who are dependent upon the forest range.

In general, the range is divided between cattle and sheep on the basis of the character of the range and of the needs of the owners of the two classes of stock. Sheep are grazed in bands, and each permittee is allotted a definite range within which he may handle his stock. Cattle, as a rule, are allowed to graze at will within certain general limits, and controlled by natural boundaries or drift fences and by salting and systematic riding of the range. It is customary for a number of cattle men to graze their stock in common and work together in their management. In the administration of the grazing business the aim is to prevent overgrazing and consequent reduction of the grazing capacity, which is often followed by destructive erosion. The use of certain areas for watershed protection, for wild game and for recreation makes it necessary in some cases to restrict grazing. Decision in these cases is made on the basis of highest use of greatest public benefit. The grazing fees are based on the following conditions:

1. The proper use of the grazing resources to best serve the public interest.
2. Reasonable consideration of the value of forage to the livestock industry.
3. The effect of the rates upon livestock producers.

Recreation and Game.

The forests are the natural habitat of many of the wild game animals and birds. The clear, cold streams of the forest are also the native home of the trout and other game fish species. It is within the forests also that people of the nearby communities and towns as well as those from distant states find recreation through camping, hunting, fishing and mountain climbing. More people use the forests for recreation than for all other purposes. Even before the forests were actually withdrawn this has been an important use of the mountainous areas. The protection of the game and the regulation of forest uses so as to make reasonable provision for recreation has been recognized from the start as one of the problems of National forest administration.

State and federal game preserves occupy 9 per cent of the net area of the National forests of Montana. Eight million, eight hundred and sixty-nine thousand acres, or 56 per cent of their area, are used exclusively by game animals. The State probably has the largest number and the greatest variety of big game animals of any state in the Union. Its conservation and propagation thus becomes a matter of economic and aesthetic importance to the State and to the country at large. The Forest Service cooperates closely with the State game authorities and the sportsmen's associations in the protection and distribution of fish and game.

Nursery and Reforestation Work.

Certain areas within the National forests have been burned over repeatedly until the timber cover has been destroyed. No trees are left for reseeding the ground, and the forest can only be established through artificial planting. Various methods of direct seeding have been tried out, but with little success. It has, however, been found practical to grow young trees in nurseries and transplant them successfully into the forest. The Savenac Nursery at Haugan, Montana, is the largest Forest Service Nursery in the United States. It produces about 3,000,000 transplants annually, which is sufficient to plant approximately 4,000 acres. The nursery supplies the National forests of northern Idaho, as well as Montana.

Various species are used, but white pine constitutes the main production, since it is the most valuable lumber-producing tree of the region. The trees are ordinarily set out in the forest when three years old. Results so far indicate a survival of from 70 to 90 per cent of the transplants. The trees on many of the earlier plantations have already reached a height of 10 to 12 feet.

If fire is kept out, the forest lands of the State reseed naturally. A single burn is ordinarily not sufficient to destroy all of the seed, and even though the old timber is practically all killed a new crop can be depended upon. If, however, a second burn takes place before the young trees are old enough to bear seed, and the area is so great that seed will not be scattered through natural processes on the surrounding forests, artificial reforestation becomes necessary. Through better fire control, therefore, the work of reforestation, which costs about \$10 per acre, can be greatly reduced or avoided entirely. The prevention of fire is, therefore, the most important part of forest management.

TABLE 5
National Forest Areas and 25% Receipts by Counties

County	Present Area in National Forests	Counties' Share Receipts from National Forests 1908-25 inclusive
Beaverhead	1,399,430	\$108,959.12
Blaine		209.32
Broadwater	148,865	18,654.95
Carbon	302,262	28,023.23
Carter	88,488	10,376.26
Cascade	185,436	25,004.79
Choteau	29,857	3,002.05
Custer		33,249.26
Deer Lodge	239,280	73,831.31
Fallon		4,313.47
Fergus	89,466	12,461.64
Flathead	1,704,603	112,185.93
Gallatin	580,315	52,716.01
Glacier	25,239	352.26
Golden Valley	23,617	437.02
Granite	664,364	47,850.43
Jefferson	447,698	94,433.27
Judith Basin	303,986	7,337.29
Lake	127,572	186.29
Lewis and Clark	809,414	51,823.34
Lincoln	1,653,867	131,927.11
Madison	763,858	107,364.93
Meagher	437,558	41,734.60
Mineral	581,979	45,710.97
Missoula	567,492	67,102.85
Musselshell		1,149.00
Park	776,962	43,452.37
Phillips	28,222	1,583.55
Pondera	121,616	1,692.45
Powder River	331,890	47,701.80
Powell	516,060	30,762.07
Ravalli	1,034,960	85,398.09
Rosebud	96,889	15,952.74
Sanders	822,080	29,790.15
Silver Bow	185,395	41,051.54
Stillwater	199,399	7,393.93
Sweet Grass	276,364	24,909.10
Teton	249,896	18,441.10
Wheatland	58,231	2,507.11
Total	15,872,610	1,431,032.70

COAL RESOURCES



With Aid of Electric Shovels Each Employee Averages 50 Tons Per Day at Colstrip—Montana's Extensive Coal Measures.



The coal measures of Montana are among the most extensive in the country.

Of the 1,051,291,000,000 tons of lignite lying within the boundaries of the United States, the United States Geological Survey reports that 381,000,000,000 tons, or more than one-third, is found in Montana.

In addition to this huge amount of lignite**, the state contains extensive deposits of bituminous coal, as shown on the accompanying map.

The coal reserves of the state, including all kinds, is estimated at 409,000,000,000 tons. This is 11.5 per cent of the total coal reserves of the United States and eight per cent of the total reserves of the world.

Nearly every section of the state shows coal deposits of greater or less extent.

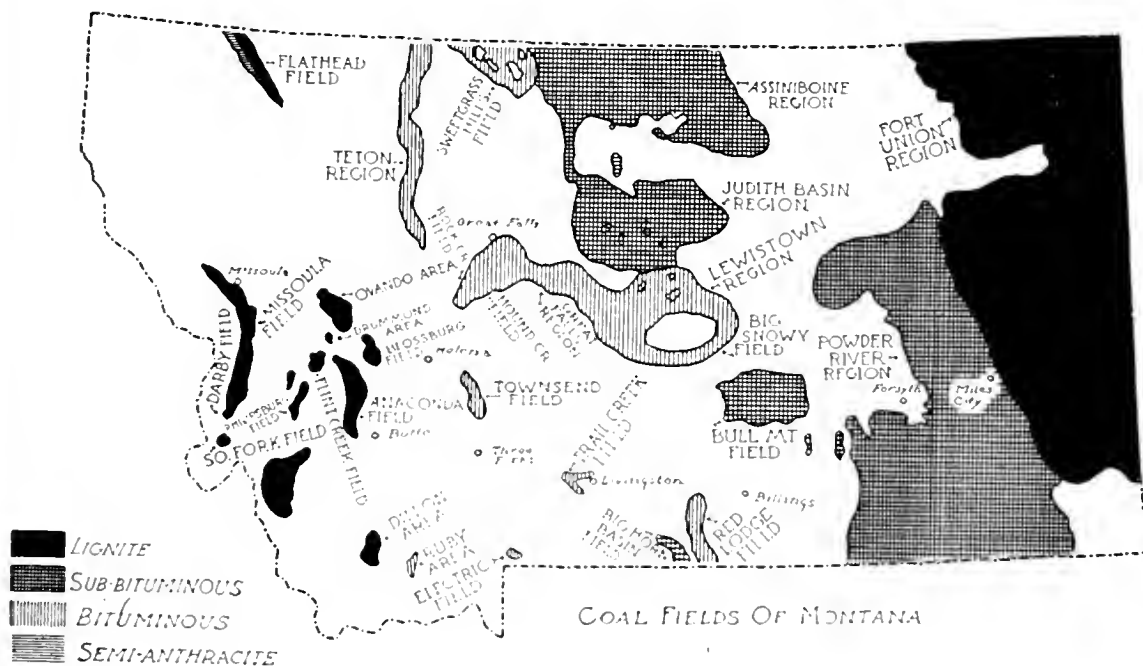
Good bituminous steam coal is found at several points, notably in the Great Falls, Lewistown, Bull Mountain and Red Lodge fields.

Small deposits of coking coal are found in the Trail Creek, Electric and possibly the Ruby field.

Sub-bituminous coal, suitable for producer gas or for steam coal with special grates, occurs quite generally throughout eastern Montana.

The coal of Montana is of varying grades, which may be classified as follows:

1. Lignite—Distinctly brown and either noticeably woody or clay-like in appearance. Of low heating value, slacks readily and completely. A good fuel for producer gas but cannot stand long transportation.
2. Sub-bituminous—Distinguished from lignite by its black color and



**Much of the lignite in Montana has been classified by geologists as "sub-bituminous" and is so indicated on the map.

apparent freedom from woody texture, and from bituminous by its loss of moisture and consequent slacking. Will not stand distant shipping but is a clean domestic fuel and excellent for making gas.

3. Bituminous—This is a coal in which the volatile matter and the fixed carbon are nearly equal. Only slightly affected chemically by weathering unless exposed for years. Many of the better coals of this group will coke.

The coals of eastern Montana are mainly lignite, changing to sub-bituminous toward the mountain uplifts of the Big Horn and other outlying spurs of the Rockies. In the mountains themselves, coking coals are occasionally found.

The seams range from one inch to fifty feet in thickness but most of the mining is on veins measuring from four to fifteen feet. Except for local use, the smaller widths are unprofitable and larger widths are found only in rare instances.

Active Coal Fields.

Of the score or more commercially potential coal areas in Montana, four are at present being actively and extensively worked. These are the Sand Coulee district in Cascade County, Red Lodge area in Carbon County, Roundup field in Musselshell county and the recent extensive strip mining operations at Colstrip, 30 miles south of Forsyth, in Rosebud County.

The Sand Coulee operations lie in what geologists term the Great Falls field, which includes the Sand Coulee basin, covering 231 square miles, the Otter Creek basin, 37 square miles, and the Sage Creek basin, 66 square miles. The Hound Creek district may be regarded as another such basin in the Great Falls field.



A Montana Coal Mine.

The best coal is found in the Sand Coulee basin, where it runs from four to 15 feet in thickness, with few and narrow partings. Extensive mining has been carried on in the vicinity of Belt and Sand Coulee-Stockett. The principal operations at present are those of the Anaconda Company at Sand Coulee. Prospects have indicated a third possible center on Smith River. Between the Belt and Sand Coulee areas is an interval of ten miles, in which the coal, if present, is covered by 100 to 200 feet of overlying formation. From there to Smith River is a 17-mile interval in which the coal lies from 200 to 500 feet below the surface. Future search in the Great Falls field is most promising in these concealed areas between points of known valuable coal deposits.

Roundup.

In the so-called Bull Mountain field, between the Musselshell and Yellowstone rivers, 26 separate beds have been recognized, named and mapped by the United States Geological Survey. The four principal ones are the Mammoth-Rehder, the Dougherty, the Roundup and the Snelling-McCleary. The Mammoth-Rehder is an area of nearly two hundred square miles, around whose edge the out-cropping coal runs from six to 16 feet in thickness. It could readily be reached by railroad spurs. The Mammoth seam yields a good grade of bituminous coal, with fair fuel value and of low ash and sulphur content.

The Dougherty seam, just to the east, runs only from one and one-half to three feet in thickness and is not quite as good coal as the Mammoth.

The Snelling-McCleary seam, located on the extreme eastern edge of Bull Mountain field, is second only to the Mammoth in width and, as far as thickness is concerned, can be mined over a large portion of its outcrop. The grade is equal to that of Mammoth.



Montana Mountain Road.

Near the city of Roundup, extensive development of the coal beds has been under way for several years, this being a source of fuel supply for the locomotives of the C. M. & St. Paul Railway, and for domestic use throughout the State. Here the seam is about six feet thick and the coal has a satisfactory fuel value.

The best coal remaining to be developed in the Bull Mountain field lies in the Mammoth and the Snelling-McCleary seams, both of which promise large tonnages of easily mined, wide bituminous coal of about 11,500 B. T. U. fuel value.

Red Lodge.

The Red Lodge field covers the coal districts of Carbon and Stillwater Counties. The chief of these are the Red Lodge, Bear Creek, Bridger, Silvertip and Nye districts. The Bridger district is on Clark's Fork, the Red Lodge district is on Rock Creek, the Bear Creek on the stream of that name, the Silvertip is ten miles southeast of Bear Creek and the Nye district is on the upper Stillwater.

At Red Lodge, eleven workable coal seams, containing an aggregate of over 70 feet of coal, are found in 800 feet of strata. At Bear Creek eight seams contain 50 feet of coal in 600 feet of the formation. Within this area are about 1,250,000,000 short tons of good grade sub-bituminous coal, all within mineable depth.

Coal in the Red Lodge district is being mined at present by the Northern Pacific railway at Red Lodge, by the Anaconda Copper Mining company at Washoe and by several companies at Bear Creek.

Rosebud.

In 1913, the Northern Pacific railway made a general geological examination of the large sub-bituminous coal vein in south central Montana known as "The Rosebud field." It was found that this vein underlies an area of 700 square miles



New Bridge Across the Yellowstone River at Glendive, Montana.

in Montana, running over into Wyoming, and that the full thickness of the vein is 28 feet. It is estimated that there are at least six billion tons in the Rosebud vein within the State of Montana.

As a result of the further intensive examination of 15 square miles on the northerly edge of the field, it was found that no less than 90,000,000 tons of mineable coal lay beneath 100 feet or less of overburden. The report recommended the construction of a railroad from the main line of the Northern Pacific, near Forsyth, 30 miles directly north of the field, and the mining of coal by open cut, power shovel methods.

To determine the value of this coal for locomotive fuel, 400 tons were mined and tested with satisfactory results, after allowing for certain changes in drafting and firing. When it was estimated that the Northern Pacific railway would save at least \$700,000 annually by substituting Rosebud for Red Lodge coal as locomotive fuel over the territory between Mandan, N. D., and Missoula, the Board of Directors authorized the construction of the branch railway and the opening of the field. Work was begun in the spring of 1923, the track reaching the field in December of that year.

The contract for mining the coal was awarded to Foley Brothers of Minneapolis. Necessary equipment was bought and installed and full-time operations were in full swing by 1925.

After thorough consideration, electrical operation was chosen as the only reliable method of handling the field. Arrangements were made with the Montana Power Company, which in 1924 built a power line from Billings through Hardin to the field, a distance of 100 miles. Foley Brothers installed an electrically operated drag line and shovel and a pair of 60-ton storage battery locomotives.



The Electric Drag Line Stripper, with Its 155-foot Boom, Removes the Overburden and Exposes the Coal.



The Electric Shovel Then Lifts the Coal in 8-ton Mouthfuls Into the Cars, Which Are Hauled to the Railroad by Electric Locomotives.

A model village and railroad station, bearing the name of "Colstrip," were constructed, the village buildings including a recreation hall, two garages, septic tank sanitary system, fourteen cottages for skilled employees and their families, two-room school building and an office building.

The operations involve the use of considerable equipment which is unique in the history of strip mining. Among these are the largest drag-line stripper ever built and a machine for lifting coal which operates the largest shovel ever constructed for that purpose.

The giant drag-line excavator is big enough to dig out an excavation for a home with only a few scoops and in a few minutes, conveying the dirt a block and a half away.

The coal shovel lifts enough coal at one time to supply the season's needs for an entire family—seven to eight tons—directly from the coal vein to a coal car, in one operation. All this it does in three-quarters of a minute.

The job calls for only 60 or 70 men to perform the work, where hundreds would be required in an underground mine. It permits each employee to average 50 tons production per day, whereas eight to ten tons are considered a good day's work per man in underground mining.

The operation at Colstrip consists merely in removing the overburden of soil, piling it to one side and then removing the exposed coal by power shovels directly to the cars, in which it is hauled to various distributing points on the Northern Pacific system.

Operations began at the north edge of the field, where a pit 8,000 feet long and 900 feet wide, containing 7,000,000 tons of coal, was laid out.

The first cut was 125 feet wide on the bottom and here the stripping and coal mining is being continued back 8000 feet.

The first coal was taken from the pit for test on locomotives. One hundred thousand tons were made available. Steam locomotives were used to haul the coal from the pit to Colstrip, a distance of about two miles. Lack of water and danger from fire in the coal pit from steam locomotives resulted in purchase by the contracting company of electric locomotives, for the first time in America making mine operations entirely electrical.

What this mine operation represents in economy is shown in comparison with underground operations. No horses are required for operation. Electric power does the entire work, save for a few men. Opening of the strip mines has also brought many economical changes to the operating department of the railroad.

The railroad company today, in its Rosebud operations, is saving from \$1.50 to \$2.00 per ton on its coal, compared with the bituminous product it has previously obtained from its two underground mines. In steam producing value, the Rosebud coal is only 20% less effective than the soft coal previously used by the Northern Pacific.

If the Northern Pacific's annual consumption reaches 1,500,000 tons, the company will be in a position to save in a single year between \$2,000,000 and \$3,000,000 on its coal bills, or enough to pay for the entire installation at Colstrip.

At present some 14,000 tons are being mined during the four or five days each week when operations are in progress.



Montana Cherries. Note the Coin to Catch the Size.

FROM MINE TO CONSUMER



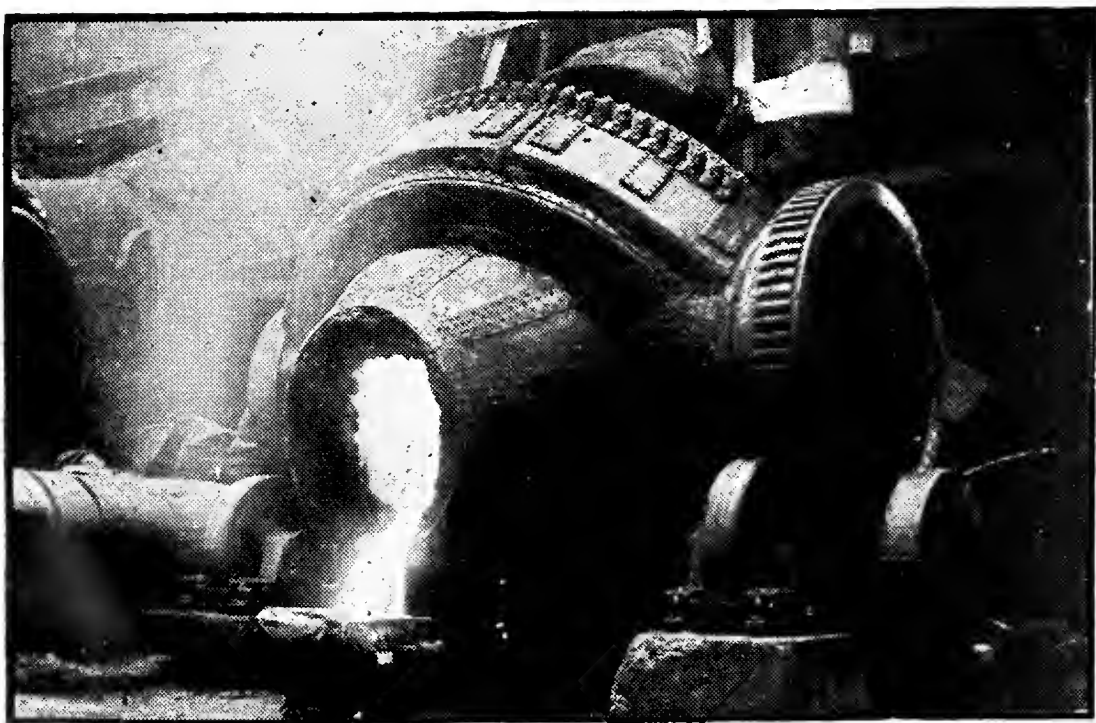
A Trip Through Smelter, Electrolytic Plant and Copper Rod and Wire Mill of the Anaconda Company.



In Anaconda is located the largest non-ferrous smelter in the world. Its huge smoke stack, 585 feet high, is the largest in the world. The Washington monument, if dropped inside, would disappear. Its yearly capacity in metallic copper, zinc, lead, silver and gold would fill 4,569 33-foot railroad cars, making a train 28½ miles long. Yet 33 times that amount of ore has to be mined and treated to produce this amount of metal.

Over the Butte, Anaconda & Pacific Railroad—the first electrified steam road in the country—there pass from Butte to Anaconda 350 cars of ore a day. These huge bottom-dump steel cars are brimming with a gray-white substance that the geologists will probably tell you is chalcocite, since that is Butte's commonest mineral. To a tenderfoot it looks like nothing more valuable than railroad ballast. Yet from this apparently worthless rock human skill and ingenuity have devised a way to produce commercial copper, silver and gold.

As a matter of fact, we have the word of the mineralogist that this unpromising mass contains 52% silica, 10% alumina, 12% sulphur, 10% iron, with smaller proportions of lime, zinc, lead, arsenic, potash, tellurium and selenium. Most of these are of little or no commercial value and they all help to "gum up the works" when it comes to the job of reduction. Of the entire mass, only 3% is copper, with traces of silver and gold.



Pouring Slag from Convertor at Anaconda Smelter.

Built at an expense of millions of dollars, the Anaconda smelter is kept everlastingly at the job of rapping Mother Nature on the knuckles and loosening her clutch on the family treasure. To do this, the highly-paid men of science use fire and water, oil and acid.

After crushing, the ore is cleverly flooded and agitated until the light and valueless portions float away to the dump as "tailings." The residue, or concentrate, containing 8% copper, is roasted, removing 80% of the sulphur, which later appears as an important by-product in the form of sulphuric acid.

After roasting we have "calcine," which goes to reverberatory furnaces for melting. The product is a matte, containing 40% copper, and slag, a waste product which is sluiced to the dump. The converters, another form of furnace, change matte into blister copper, which, in turn, after treatment in the refining furnace, is shaped into anodes containing 99.3% copper, with about 70 ounces of silver and four-tenths of an ounce of gold to the ton.

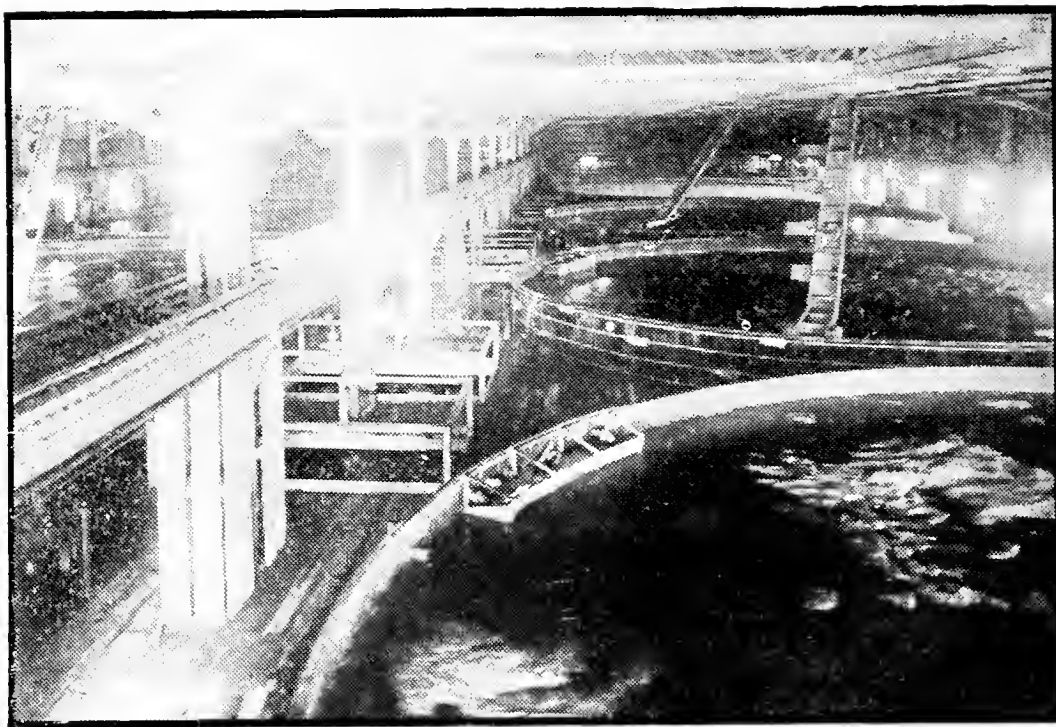
The processes just described take care of the bulk of the metal content. In the tailings that go to the dump, there still remain appreciable quantities of copper, silver and gold, and after some years have elapsed, permitting the oxidation of these tailings, they are subjected to a leaching process. Weak sulphuric acid removes the copper metal from the tailings, carries it in solution and gradually precipitates it in a mud form, or "copper cement" upon a picturesque assortment of old iron junk, reposing in open air tanks.

In connection with the oil flotation process, a miner's wife is said to have discovered while washing her husband's overalls that small grains of metal invariably rose to the top of the soap bubbles in the family washtub. Whether or not this is so, a process utilizing the same principle is now in operation at all sulphide copper plants for extracting metal from the finer portions of crushed ore.

By the leaching and the oil flotation processes approximately 18% of the metal values, formerly sluiced to the dump as waste, are now recovered.



Compressed Air Locomotive and Train at Smelter.



Leaching Tanks at Anaconda Reduction Works.

From "Anode" to "Ingot."

One hundred and ninety-six miles northeast of Anaconda is located the Great Falls Reduction Department of the Anaconda Copper Mining Company, where are located an electrolytic copper refinery, an electrolytic zinc plant, and a rod and wire mill.

The last process performed at the Anaconda plant is the casting of the so-called "blister" copper in the shape of "anodes." These great slabs, about a yard long, two-thirds as wide, nearly two inches thick, and weighing nearly 600 pounds are cast so that two of the corners are provided with ears, or lugs, the purpose of which is plain when one enters the vast, barracks-like tank room at Great Falls.

Suspended by these ears in huge wooden tanks—of which there are more than a thousand, all containing weak sulphuric acid—are more than 25,000 of these anodes. Personally escorting each, as "companions of the bath," are a like number of "cathodes,"—thin sheets of pure copper. Through the acid a current of electricity is constantly passing, of which an anode is the positive, and a cathode the negative terminal. To the astonishment of the bystander he learns that the combination of "juices," electrical and chemical, actually dissolves the anode and deposits upon the cathode a coating of pure copper.

The job is unhurried. It takes 24 days for an anode to do what a lump of sugar does instantly in your morning cup of coffee. Every six days, however, the cathodes, having imbibed about as much copper as they can stand,—about 130 pounds—are withdrawn and fresh recruits drafted for service. During this process the impurities, including the gold and silver residues, sink to the bottom and are afterwards drawn off, dried, and shipped to eastern refineries for final recovery.

The finished anode is practically pure copper. But as it resembles nothing so much as a huge sheet of peanut brittle, it is in no shape to be shipped to a rolling mill. So it goes to the furnace refinery to be remelted, endowed with oxide and cast into forms suitable for the use of the fabricators. These shapes consist of



Minerals Separation or Flotation Machines at Anaconda Reduction Works.

wire bars, slabs, cakes, billets, and ingots, each adapted to the particular use for which it is intended—rods, sheets, tubes or castings.

A copper refinery has two jobs. One is to produce the high grade copper upon which the electrical and other industries are so dependent. The other is to recover from the blister copper its precious metal content. About 80% of all the silver, and 15% of all the gold of the world come to us as by-products of the copper, lead, nickel, and cobalt refineries.

The impurities which sink to the bottom of the electrolytic tanks are known as "slimes" or "anode mud." In addition to some copper which has failed to attach itself to the cathodes, these slimes contain considerable silver and small percentages of tellurium, lead, arsenic, antimony, selenium, nickel, bismuth, gold, and iron, their proportions to the entire mass being in the order named.

Electrolytic Zinc.

In 1916, after years of experimentation, metallurgists of the Anaconda Company perfected an electrolytic process for zinc reduction. Today eight of the company's mines at Butte are delivering zinc ores to the Anaconda concentrator, whence they are shipped to the zinc plant at Great Falls as "concentrates"—ores from which much of the waste material has been removed by crushing, agitating and flooding.

Here the concentrates are fed to a roasting furnace which converts zinc and lead sulphides into sulphates, expels excess sulphur and oxidizes iron and other metal content.

They next go through the leaching solution—return acid from the electrolytic tanks—which purifies the zinc content and rids it of undesirable alloys, at the same time changing it from a solid to a liquid and carrying it in solution to the tank room, which, to the casual observer, looks like a twin sister of the copper tank room. But there is a marked difference in the goings-on in these two electrochemical bath tubs. In the copper refinery, the job of the electrical and chemical

juices is merely to transfer the copper of the anode to the surface of the cathode. In the zinc plant—where, by the way, ten times as much electrical energy is required—the task is to change the zinc solution to a solid and precipitate it upon aluminum sheets, suspended in the bath much as were the cathodes in the copper refinery.

At regular intervals men strip these aluminum sheets of their zinc accretion, take it to the casting plant and melt and pour it into slabs weighing around 50 pounds each.

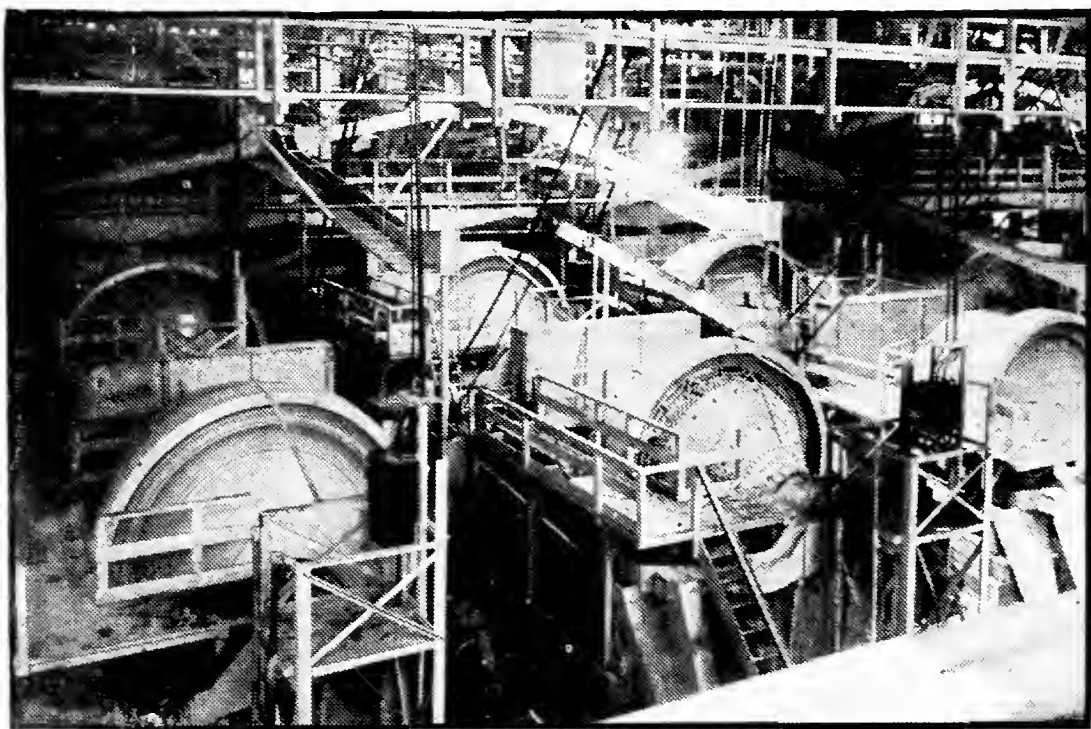
By this process, after years of effort and the expenditure of \$7,000,000 in experimental and construction work before a penny of profit was realized, was evolved electrolytic zinc, 99.9% pure.

Great Falls Rod and Wire Mill.

Up to 1918 an evergrowing amount of metallic copper had gone to the Atlantic Seaboard to be made into sheets, rods and tubes and particularly copper wire, only to begin a return journey across the continent for use in the land of its nativity and along the Pacific Coast. But eight years ago the rod and wire mill at Great Falls changed all this by affording the far west a convenient supply base for copper rods and wire and giving the Anaconda Copper Mining Company clear title to the slogan: "From Mine to Consumer."

In the making of copper rods and wire, the Great Falls plant takes from the near-by refinery the 200-pound wire bars and places them on a table at one end of a bar-heating furnace. Here a pusher, operated by compressed air, moves them along into the furnace, which holds 100 bars, lying side by side. Fuel oil furnishes the heat and it takes one hour for a bar to be properly heated.

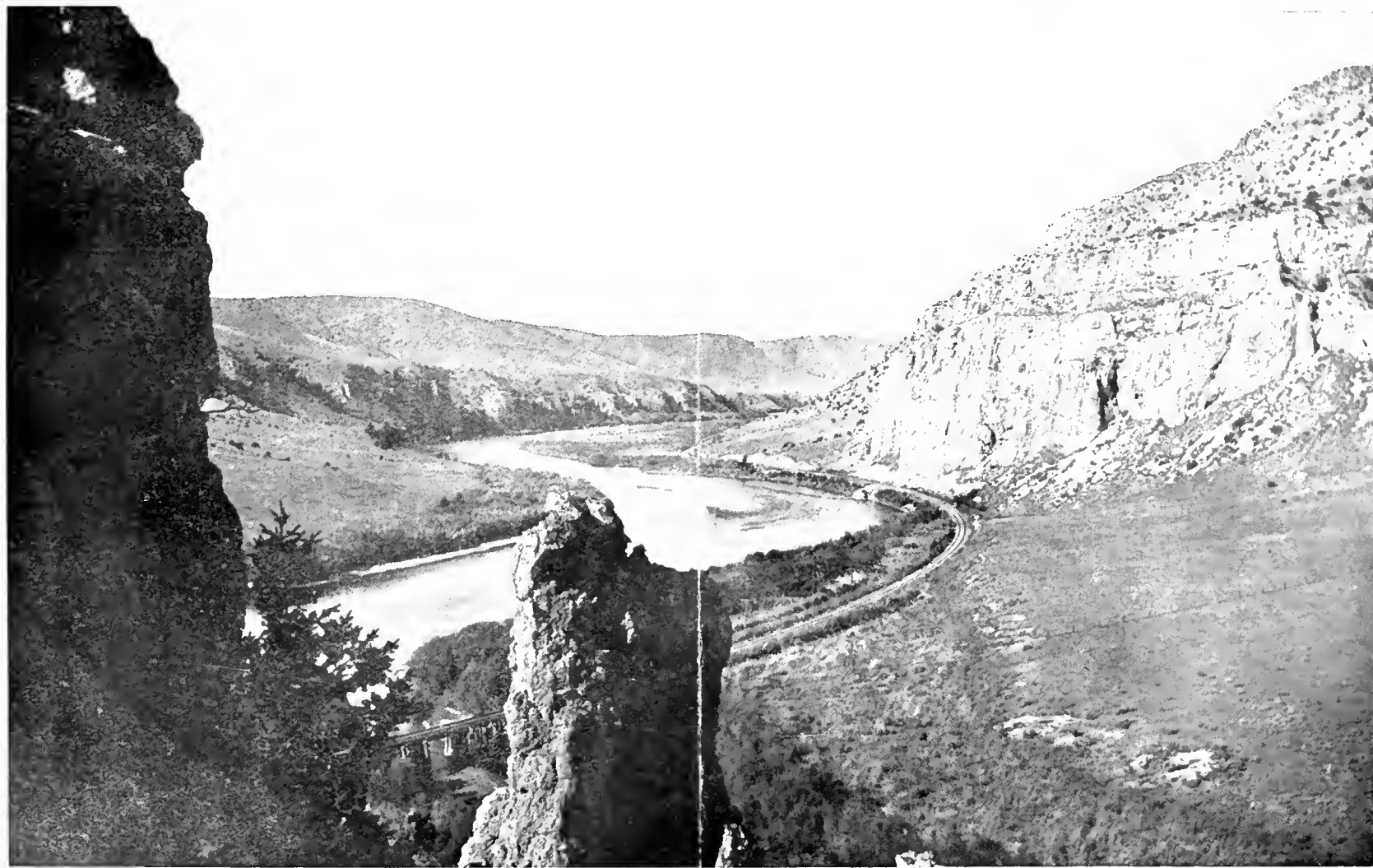
At the rate of 100 an hour, strong-armed workmen remove these white-hot bars with a pair of tongs suspended from a trolley which runs in line with the first groove in the "roughing" mill. This mill consists of a series of motor driven



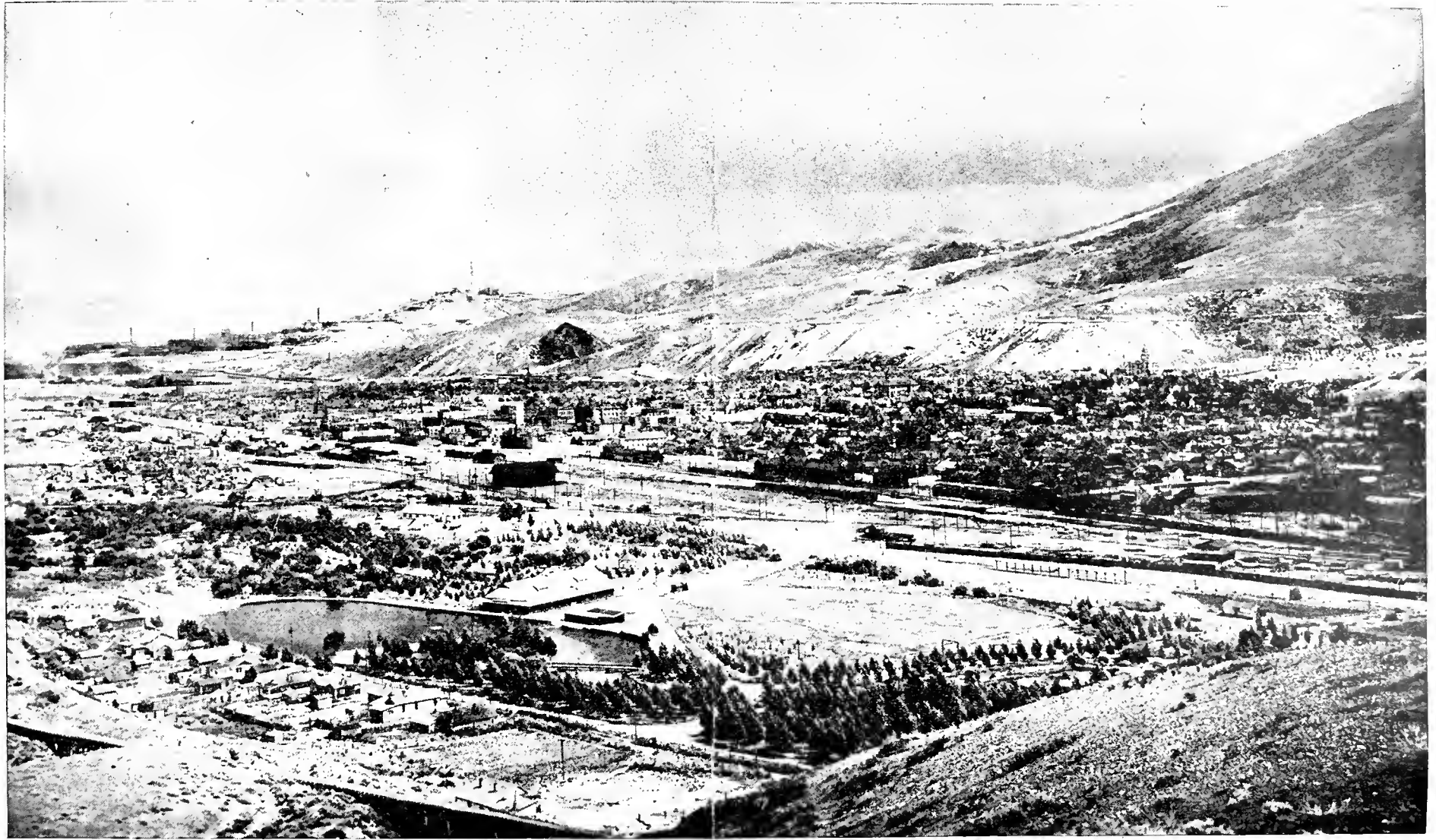
Hardinge Mills at a Montana Concentrator



ANACONDA, MONTANA—Site of the world's largest non-ferrous smelter.
Reduction Department of the Anaconda Copper Mining Company. In the fore
and recr



Along the Railroad in Western Montana.



ANACONDA, MONTANA—Site of the world's largest non-ferrous smelter. A clean and attractive city of 12,000. In the background is seen the Anaconda Reduction Department of the Anaconda Copper Mining Company. In the foreground lies Washoe Park, maintained by the Company as a community athletic and recreational center.



A clean and attractive city of 12,000. In the background is seen the Anaconda
ground lies Washoe Park, maintained by the Company as a community athletic
eational center.

rolls, one above the other. As the bar emerges from the first groove it drops and enters the second, passing back through this to the side of the machine from which it started. This process is repeated in succeeding rolls until it has been drawn and squeezed seven times.

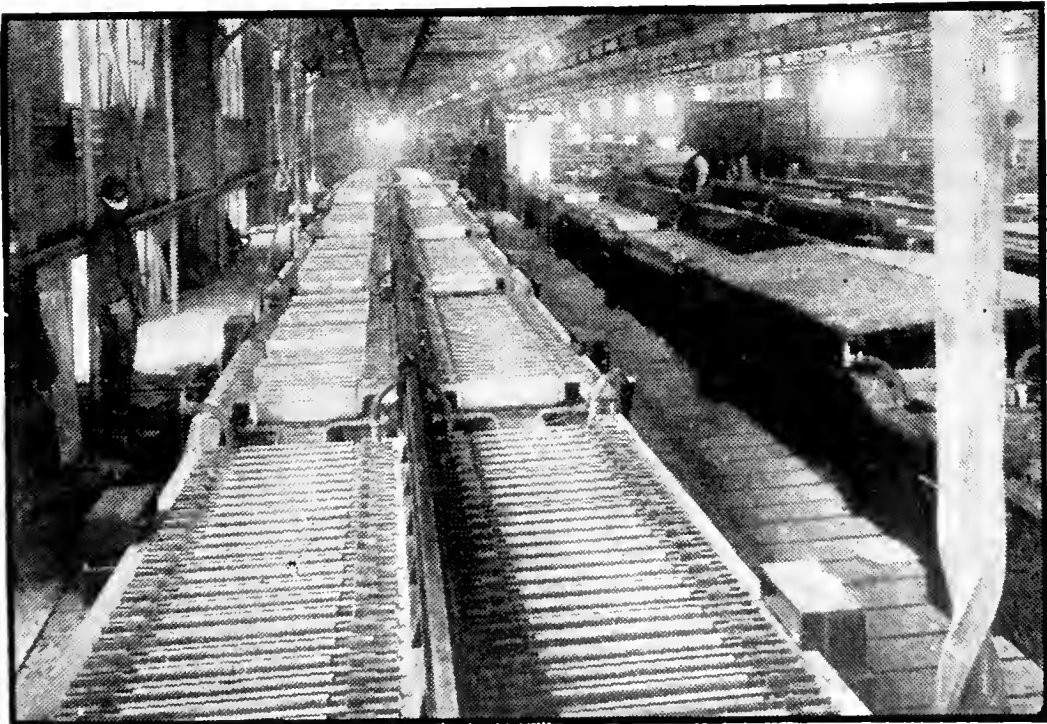
By this time it has become a long, fiery, red serpent, hissing and sizzling all over the place. Accomplished snake charmers now catch it and pass it back and forth through other pairs of rolls until the obstreperous ophidian is thoroughly "taken down" and reduced to its proper finish and size.

During these operations our copper rod has undergone every stage of heat from white to red, but by now it is almost cold and black with oxide, stolen from the air. Its next pilgrimage is through an iron pipe into a machine which winds it into a coil. After successive baths in sulphuric acid and water the black disappears and it presents the complexion of a sunburned swimmer. From these rods, ranging in size from one-fourth to five-eighths of an inch in diameter, wire is made.

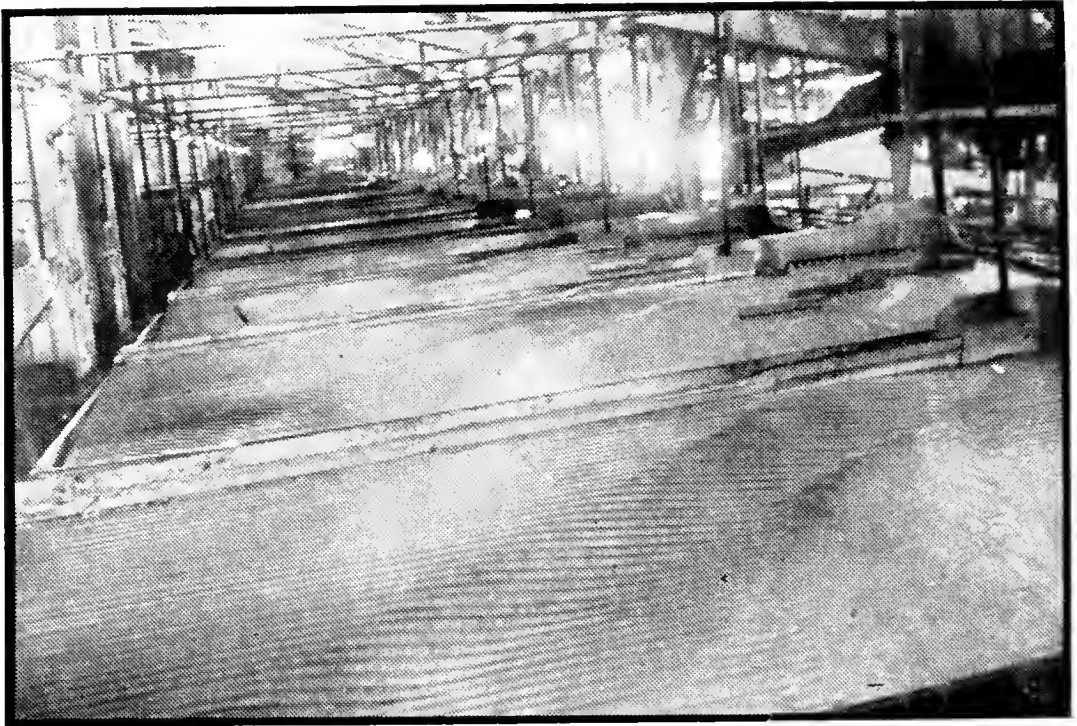
For the larger size wires, a rod is drawn through one cast-iron die at a time until finished. For the smaller sizes it is placed on a continuous wire-drawing machine and drawn through a series of dies, all at one operation. It is then drawn into a coil on a revolving block or else wound on a reel. Usually a die will draw about five miles of wire before the hole gets too large and has to be reamed out and returned to service in making larger size wire.

Wire-drawing hardens copper. If this is the product desired, it is now ready for shipment. But if soft-drawn wire is wanted, it is passed through an annealing furnace—which means that it is merely reheated enough to make the wire soft and pliable.

The plant also has a complete stranding equipment with which it manufactures copper cables, varying in size from a simple two-strand combination up to the huge cables used in high-power transmission and containing hundreds of separate wires.



Electrolytic Tanks for Zinc.



Wilfley Tables in a Montana Concentrator.

Superphosphate Fertilizer.

Within the past five years the Anaconda Copper Mining Company has developed at its plant at Anaconda the production of "Anaconda treble superphosphate," the capacity of the plant having been enlarged until it can now handle 220 tons of raw material and make 128 tons of finished product per day. "Mineral Resources of the United States," a publication of the United States Geological Survey, in its issue for 1920 contains the following description of the process of manufacture:

"At the plant of the Anaconda Copper Mining Company large quantities of sulphuric acid are derived from smelter fumes. High freight rates and distance from market have made it practically impossible for the company to market this sulphuric acid, and the metallurgical department therefore conducted experiments for a considerable time at the old Bradley plant at Anaconda in the utilization of this acid in the manufacture of fertilizers. The Anaconda Company owns phosphate deposits at Melrose and Garrison, Montana, and did some development work at both places. The manufacture of "Anaconda treble superphosphate" was begun in the summer of 1920 in a plant having a capacity of 50 tons of raw material a day. The process of making superphosphate is, briefly, as follows: Raw phosphate rock is crushed and ground in Hardinge mills to about 80-mesh; it is then treated in agitators (tanks) with 60% sulphuric acid, ton for ton. The solution goes to Dorr thickeners, thence to an evaporator; and the concentrated solution is mixed with finely pulverized raw phosphate rock in the proportion of 2:3. The finished product is said to contain about 48 per cent available plant food."

The plant now uses a special grade of phosphate rock, mined at the company's property in Conda, Idaho.

LEAD SMELTING



East Helena Plant Retains First Place as World's Largest Lead Smelter.



By Florence Sanden.

Last year, 1925, 300,000 tons of ore and flux were smelted at the American Smelting and Refining Plant at East Helena. It is predicted that with the compiled figures of 1925, the smelter will retain first place as the largest lead producing smelter in the world.

Operations show that more than one million dollars in ore and payroll checks is being handled through the banks of Helena and East Helena every month.

Over 400 men are employed in the plant, which operates on a 24-hour basis with three shifts. These men collectively receive more than \$75,000 per month in salaries.

An up-to-the-minute safety department is maintained and health is safeguarded through a company medical service, bath and change houses, sanitary equipment and a pure water system.

These are a few of the facts that go to show the successful advancement of the smelter during the past few years. Even now, with all the furnaces operating full time, the hills are being combed for more ore, old dumps are being scratched, old mining industries are being revived—all in the endeavor to build up the tonnage prospects and assure Montana of her birthright place in the mining world.

Montana supplied 60% of the ore that went through the East Helena smelter last year. One-third of this production, however, came from the Great Falls zinc plant residues which consist largely of ores originating in the Coeur d'Alenes and in Utah; two-thirds of this 60% was straight Montana ore coming from mines scattered throughout the state.

Of the remaining 40% supply, 34% of last year's business came directly from the mines operating in the Coeur d'Alene and 6% from over the Canadian line in British Columbia.

In order to handle the increasing new business, due partly to the fact that shippers are realizing more and more the good values of the East Helena smelter, \$100,000 has been allotted to the plant for new construction work. A new roaster will be installed and the blast furnaces enlarged to increase the output of the smelter 10% over its present capacity.

The history of a lead smelter is one improvement after another, made necessary by the new methods requiring new treatment, and the East Helena plant is no exception to the rule. As a consequence, even though the plant itself was built many years ago, the machinery and methods employed have been revamped every ten years in order to bring the smelter up-to-date in all respects.

Particularly interesting to the layman, and extremely enlightening to the shipper is the sampling process used at the East Helena plant.

The ore upon arrival is weighed on Northern Pacific scales that are checked with frequency by the federal testing department; representatives from both

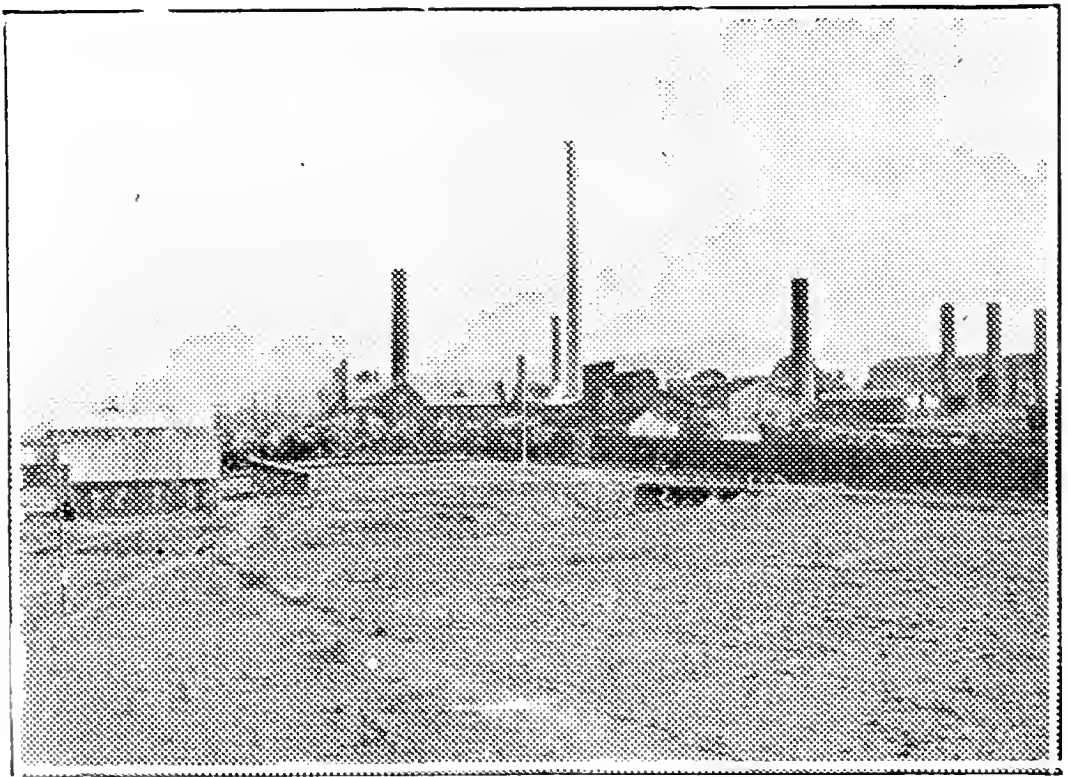
the railroad and the smelter are present. These representatives are sworn weigh masters and are responsible for their reliability and honesty not only to the railroad and the shipper but to the Western Weighing Bureau Association.

On the basis of this weight, freight charges are collected by the railroad and the ore then sold to the smelter on the valuation of the car which is subsequently determined by sampling and assaying. A moisture sample is taken in the presence of the shipper or his representative to determine the dry weight of the ore—the dry weight being the basis of settlement with the shipper.

The ore is then switched to the sampling mill, passed through a crusher and an automatic sample cut from the stream of crushed ore. This automatic sampler is known as a Vezin sampler and cuts one-fifth from the entire shipment. This one-fifth is reduced in size and further one-fifth portions cut out until the final sample is one-six hundred and twenty-fifth of the weight of the original shipment. At the same time a sample consisting of 2% of the weight of the shipment is automatically cut out to comply with the Montana state laws on ore sampling.

The mill sample is then further cut down in quantity and pulverized to pass through a 100 to 150 mesh screen. This resulting pulp is divided into three portions, one of which goes to the shipper, one retained by the smelter and one sealed and held for the umpire in case of disagreement on assays submitted by the shipper and smelter. This umpire-assayer selected is one mutually agreed upon by shipper and smelter. These pulp samples actually represent the metal contents of the shipment and are assayed by both parties for value.

On the basis, then, of the dry weight of the original car and the assayed value per ton as determined by the mill sample, the ore is purchased by the smelter.



The Largest Lead Smelter in the World, East Helena, Montana.

MONTANA RAILROADS



Increase in Mileage Measures Growth of State—History and Development of Important Industry in State.



The increase of railroad mileage measures the growth of a state. In 1879 the railroad mileage in Montana was "0;" it was 2,735 in 1894; 3,307 in 1907; 4,342 in 1909, and 7,000 in 1926.

Movements of commodities in Montana in 1925 as compared with 1924 show an increase of 1,199 cars of freight. In the earlier year, according to the estimates of the Montana Railroad commission, 321,772 cars of freight were loaded. In 1925 the loadings aggregated 322,971.

An important Montana industry today is the care and maintenance of locomotive freight and passenger cars—the "flying shuttles that weave the endless web of transcontinental transportation along Montana's 7,000 miles of steel."

THE NORTHERN PACIFIC.

To Thomas Jefferson belongs the honor of planning and setting on foot the enterprise of exploring the interior continental region now traversed by the Northern Pacific Railroad. When in Paris as American Envoy he interested John Ledyard, a companion of Captain Cook, in a journey that contemplated taking passage in a Russian trading vessel to Nootka Sound and then to "fall down into the latitude of the Missouri River and penetrate to and through the United States." Ledyard failed in accomplishing the idea because he was arrested by the Empress of Russia and taken a prisoner to Poland.

Jefferson held fast to the idea and when president sent Lewis, his private secretary, and Clark across the continent on their journey of discovery. The route taken by Lewis and Clark is in a large part the route of the Northern Pacific of today.

When the project of a railroad across the continent was first broached, the northern route by way of the valleys of the Missouri and Columbia was the only way considered. It was known to be a route thru



Along the Line of the Northern Pacific.

valleys and over plains for almost the entire distance. In addition, it avoided the deserts lying farther south. The acquisition of territory following the Mexican War and the discovery of gold in California caused the government to lend its support to the middle route and for a long period of years the northern route was neglected.

Construction work on the Northern Pacific began in the summer of 1870. Late in the summer of 1883, the long lines of the railroad advanced; one from the East, the other from the West, and met on Independence Day, near the summit of the Rocky Mountains. The trail of Lewis and Clark had been spanned by the steel rail.

Since 1883 the increase in the Northern Pacific mileage in the State of Montana has been approximately as follows:

1883	950 miles	1903	1,775 miles
1893	1,300 miles	1913	2,235 miles
1925			2,415 miles



The North Coast Limited



Extensive Farm Operations Are the Rule Along the Northern Pacific.

The figures include all secondary and branch line mileage, the actual mileage of road in Montana being 1,650. The additional miles of track, including seconds, third sidings, passing tracks, etc., bring the total today to 2,415.

In the beginning of 1926 the Northern Pacific employed in Montana 6,400 people, to whom was paid in wages in 1925 a total of \$9,650,000.

In the year of 1925 this company expended in additions and betterments \$1,500,000. The expenses of operating the road in the State in 1925 were approximately \$19,000,000.

The average number of freight and passenger locomotives assigned to Montana is 295 and the tremendous volume of business is shown by the fact that in 1925 the number of passenger miles in the state was 121,350,000, of which the trans-state business was 58,300,000.

The Northern Pacific handled in 1925 in Montana 2,221,000,000 tons miles of freight of which the trans-state was 1,706,000,000. This company paid in taxes in 1925, \$2,022,862.33.

An average of \$375,000 a year has been expended by the Northern Pacific Railway since 1922 in advertising Montana and the Northwest.

A list of Montana publications issued by the company is as follows:

MONTANA, THE TREASURE STATE,	TIMBER BILLIONS,
FLATHEAD VALLEY FOLDER,	THERE IS A HAPPY LAND,
GALLATIN VALLEY, MONTANA,	THE LAND OF BETTER FARMS,
THE LAND OF OPPORTUNITY,	POWER FOR SUPREMACY.
THROUGH THE AMERICAN WONDERLAND,	

THE GREAT NORTHERN.

The Great Northern Railway operates 1,743.77 miles of railway in Montana, has trackage right of 22.23 additional miles, making a total of 1,766 miles, the largest mileage operated by a single company in one state. Its main transcontinental line crosses northern Montana, east to west, 684.6 miles. Additional main lines extend from Havre to Butte, 294 miles, and from Billings to Shelby, 334 miles.

An inspection of the map will show that this primary system covers practically all of northern and central Montana. From it branches reach into important localities. These may be extended and additional branches constructed to adequately serve new territory as it is developed.

History.

The Great Northern entered Montana in 1887, when its main line was extended from Minot, N. D., to Helena, Montana, a distance of 645 miles, breaking all previous railroad construction records for a single year.

From Havre to the Pacific coast construction was begun in 1890 and completed in 1893. The Continental Divide of the Rocky Mountains is crossed at an altitude of 5,202 feet, the lowest of any American railway. Only about 40 miles lie above 4,000 feet.

The entire main line across northern Montana was constructed through a totally undeveloped region where extensive settlement and agricultural development did not take place until about 20 years later.

The line between Billings and Great Falls was built in 1908. The most recent construction is in northeastern Montana between Scobey and Opheim, where 20 miles of a 50-mile extension was built last year, and the balance will be built during the summer of 1926. The estimated cost of this extension is \$1,190,000.

From the east line of Montana to the Rocky Mountains along the Great Northern is an almost unbroken area of open prairie, an immense region more than 450 miles in length east to west and averaging about 200 miles in width.

In addition to several hundred thousand acres of irrigated land, only partly developed, there are several million acres of non-irrigated land suitable for grain growing, livestock raising and diversified farming.

In every locality farm development is substantially estimated, but a large portion of the land remains to be placed under cultivation.

In the decade between 1908 and 1917 almost 30,000,000 acres of public domain passed into private ownership through the homestead and other public land laws. This decade witnessed the largest settlement of public land that ever took place in any state and marked the beginning of agricultural development that has placed Montana among the important agricultural states in the Union.

In the year ending June 30th, 1925, the Great Northern transported almost 26,000,000 bushels of grain from Montana, of which over 24,000,000 bushels was wheat, almost one-half of the State's wheat crop of 1924. During the same year the company transported 6,499 carloads of livestock.

West of the Rocky Mountains the Great Northern serves a large territory of undeveloped agricultural and timber resources. It embraces several fertile valleys, of which the Flathead Valley is the largest and most extensively developed.

The Great Northern employs about 6,500 people in the operation of its lines in Montana, and the annual operating expenses, including cost of labor and material, in recent years have averaged about \$20,000,000. Over \$1,740,000 taxes were paid in Montana in 1925.

A program of betterments and improvements of the railroad property is carried out at an annual cost of several million dollars. In 1924 this investment amounted to over \$3,633,000.

The Great Northern conducts a continuous campaign of education to promote settlement and development of the agricultural resources of Montana. This program is carried out through newspaper advertising, exhibitions of the agricultural products at important fairs and expositions, lectures illustrated by motion pictures and stereopticon slides and by personal activities of traveling representatives who are thoroughly familiar with every section of the country and its farming opportunities. The company publishes a general book that describes all sections of Montana tributary to the Great Northern Railway and outlines the development that has taken place as well as possibilities of the future. In addition to general information the book contains numerous letters from settlers that give their personal experiences.

The sugar beet industry is making substantial progress in the irrigated sections of the Lower Yellowstone Valley, the Milk River Valley, the Sun River Irrigation Project and the Conrad-Valier district.

A book is published on the irrigation projects of Montana and separate publications are issued giving detailed information about sugar beet growing and the possibilities of this development.

New sugar factories have been placed in operation in the Lower Yellowstone Valley and in the Milk River Valley. Sugar beets provide a substantial foundation for the development of high class diversified agriculture on all of the irrigated land in northern Montana. They have been found well adapted for the natural conditions of this region and produce beets of high yield and sugar content.

Montana received a large amount of advertising in the Pacific Northwest million dollar joint campaign of the Great Northern, Northern Pacific and Burlington during the past three years. In this period advertisements were carried in magazines of national circulation and farm magazines, a total of perhaps 500,000,000 announcements. Between 700,000 and 800,000 booklets were published and distributed and 125,000 direct inquiries answered. Full page advertisements featuring Montana were included in this program. In the booklets that were published at a cost of over \$50,000 the resources of Montana were included in the following:

MONTANA FOR THE FARMER.
LAND OF OPPORTUNITY.
AMERICAN WONDERLAND.

THERE IS A HAPPYLAND.
LAND OF BETTER FARMS.
POWER FOR SUPREMACY.

TREASURE LAND.
TIMBER BILLIONS.



THE CHICAGO, MILWAUKEE & ST. PAUL.

The entrance of the Chicago, Milwaukee & St. Paul Railway into the State of Montana dates from 1901—25 years ago—when the first reconnaissance work was begun.

In January, 1906, survey parties were organized and sent to Miles City and Harlowton, to locate a line from Montline to a point just west of Harlowton, a distance of 357 miles, there connecting with the Montana Railroad, already constructed.

The line from the eastern boundary of the State to Harlowton was completed in 1908 and to St. Paul Pass Tunnel—the western boundary—in 1909.

When construction work was begun in 1906, the country between Montline and Terry was practically uninhabited, there being only one ranch house between Montline and Ismay and one cattle ranch between Ismay and Terry. At Ismay there was a ranch house and a small amount of land under irrigation. The bench lands on either side of Corral, Sandstone and Fallon Creeks were unoccupied. The wide valley of the Yellowstone River between Bluff Port and Terry was devoted entirely to grazing, but it is now largely under cultivation. Through the Fort Keogh Military Reservation, west of Miles City, the land was not under cultivation, but at the present time is cultivated by non-irrigated methods. Between Antwerp, in the Big Porcupine Creek Valley, and the first crossing of the Musselshell River, a distance of 50 miles, only one ranch was in existence, while at the present time grain fields are scattered along the line between Vananda and Bascom and along the Musselshell River.

The Musselshell Valley was under irrigation from Harlowton east for a distance of about 100 miles. Large alfalfa fields covered the entire valley. Large flocks of sheep and herds of cattle were wintered here. Oats and some wheat were grown.

From Melstone west to Harlowton the line follows the valley of the Musselshell River, crossing the river 12 times on steel bridges.

Many irrigation systems were encountered and had to be provided for.

Between Piedmont and Butte the railway crosses the Continental Divide in a very rough, mountainous country requiring much heavy work.

At Haugan the ascent of the east slope of the Bitter Root Mountains begins, and the mountain grade with correspondingly heavy mountain work continues to St. Paul Pass Tunnel. Numerous high timber bridges were built during the original construction which were filled later, largely by sluicing. This country was virgin forest, with no trails.

When the Milwaukee Road's extension through Montana to the North Coast was decided, 25 years ago, trans-continental business had assumed important proportions and the then existing facilities were unable to move the tonnage promptly or satisfactorily.



The Olympian in Montana Canyon.

Business men on the Coast urged the speedy completion of the Milwaukee's line so that the congestion on other lines might be eliminated and the movement of traffic to and from the Sound expedited.

There was also a heavy and increasing trans-Pacific traffic to be considered, and, of course, the natural development of the fertile valleys and prairies was relied upon to furnish an important share of the railroad's tonnage.

That these calculations were sound is proved by the fact that for a number of years after the completion of the line through Montana and to the Coast a heavy and profitable business was enjoyed by this railroad.

Other conditions developed, however, that could not have been foreseen at that time. The Great War with its disturbance of the normal relationship between earnings and expenses, and the diversion of business to waterways completed years after the construction of the Milwaukee Railroad, both seriously affected the fortunes of this railroad.

In the face of these and other unsatisfactory developments the Chicago, Milwaukee & St. Paul Railway has established itself strongly in Montana and its neighboring states.

This is shown by the fact that there are in Montana 252 points at which the Milwaukee Road has facilities for handling business, and of these 191 are served solely by this Road.

The fact that the Milwaukee Road is a most important carrier in Montana is also supported by freight traffic figures showing that close to 70% of the ton miles moved by this railroad in Montana and Washington originate at or are destined to points in those states not served by any other rail line.



An Electric Locomotive Along the Trail of the Covered Wagon.



B. A. & P. Ry. Train of 75 Cars of Ore.

It is interesting to consider the value of this railroad in other ways to the residents of Montana:

It has an important investment in right-of-way, station and service buildings, equipment, electrification, and in over 1,550 miles of tracks, much of it costly mountain railroad and all of it built without Government grants or aid.

It pays taxes amounting to over \$1,000,000 annually, for the construction and maintenance of institutions and facilities for the benefit of the citizens of this State.

It employs some 3,400 persons in Montana, and their pay rolls amount to \$5,500,000 a year.

It purchases yearly about \$1,500,000 worth of materials and supplies from producers and manufacturers of this State.

It is evident from the foregoing that in every way in which any industry can become closely and favorably identified with a community or a state, the Milwaukee Railroad is identified with Montana.

The most important and outstanding feature of the Milwaukee's construction activities in the State was the electrification of 415 miles of the line from Harlowton west to the State line.

This was begun in December, 1915, and completed in February, 1917.

The power is obtained from various streams in central and western Montana, mostly headwaters of the Missouri River. The current is transmitted to the substations, of which there are 13, at 100,000 volts, alternating, where it is transformed and converted to 3,000 volts direct current for train operation.

This electrification has made it possible to operate much more economically over the mountains than by steam power. Each of the mammoth motors can

haul over the steep grades with apparent ease a train that it would take two or three steam locomotives to handle. By the electrification many steam engines were released for use on other parts of the railroad where water power for electrification is not readily available.

One interesting feature of electric operation is the fact that no fires are set by the motors. This is an important advantage in the heavily timbered regions where forest fires cause so much loss.

There are 26 tunnels on lines within the State—totaling 20,571 lineal feet. The St. Paul Pass Tunnel—length 8,771 feet—at the summit of the Bitter Root Mountains, lies partly in Montana and partly in Idaho.

The Milwaukee has three crossings of the Yellowstone River, twelve crossings of the Musselshell, six crossings of the Hell Gate River, three crossings of the Missoula River, two crossings of the Missouri River, and three crossings of the Jefferson River.

The total weight of steel in these bridges amounts to 26,500,000 pounds. These bridges, and viaducts at other points, range from 330 feet to 2,000 feet in length, and from 75 to 200 feet in height.

In the last year a large number of culverts have been replaced with concrete, about 60 miles of track laid with 85-pound rail has been relaid with 90-pound rail, and other important maintenance and replacement work has been carried out. Such activities will, of course, be continued in future to keep the property in first class condition and make improvements wherever possible.

One item of special interest is the proposed construction of a 13-mile extension of the Big Blackfoot Line to facilitate timber operations along the Big Blackfoot River in Missoula County.

THE OREGON SHORT LINE.

Following are the statistics relating to the Oregon Short Line in Montana:

Class of Employees	Number of Employees	Wages Paid	Expended for Improvement
Yardmen	3	\$ 7,641.05	\$
Stationmen	40	73,639.54	.....
Trainmen	27	67,981.35	.....
Enginemen	32	79,805.79	.....
M. P. & M.	53	96,531.62	.....
Traffic Office	7	17,403.60	.....
Rental of Office .....	.....	1,200.00	.....
M. of W. & S.	190	204,000.00	4,000.00
West Yellowstone .....	.....	.....	62,608.00

Joint Facilities	Rent	Maintenance	Operation
Silver Bow Station	\$ 360.00	\$ 500.00	\$ 6,600.00
Trackage Silver Bow-Butte	7,000.00	3,000.00	2,400.00
Butte Passenger Station	21,420.00	2,400.00	12,000.00
Butte Joint Yard .....	.....	12,528.00	12,000.00
Enginehouse and Freight House.....	6,480.00	.....	.....

Railroad History.

The Utah & Northern was constructed from Eagle Rock, Idaho, territory to Red Lake, Montana, territory early in 1880, being a three-foot gauge line built of

35-pound rail. In 1881 this line was extended to Butte City. A branch was built from Silver Bow to Northern Pacific Junction in 1883, and in 1884 a branch was built to the Anaconda mines.

The gauge of the railroad was changed from three to standard gauge (4 feet 8½ inches) on the line from Pocatello, Idaho, to Silver Bow, Montana, in 1888, and on August 1, 1899, the Utah & Northern Railway was consolidated with the Oregon Short Line Railroad Company.

There has been relatively little increase in main line mileage constructed in Montana since 1899, the only new line built being the extension of the branch from St. Anthony, Idaho, to West Yellowstone, Montana, of which about four miles are in Montana. It is, therefore, impractical to furnish chart covering increased mileage by ten-year periods, and relation to mileage increase to population and development as called for by this heading.

ROAD AND BRIDGE TAXES LEVIED—1925

	Road	Bridge		Road	Bridge
Beaverhead	\$ 29,749	\$ 13,748	Meagher	\$ 12,188	\$ 4,130
Big Horn	27,407	23,126	Mineral	18,521	7,463
Blaine	30,721	13,768	Missoula	30,438	30,492
Broadwater	13,005	3,849	Musselshell	21,261	9,868
Carbon	33,641	15,432	Park	35,494	14,208
Carter	12,892	5,964	Phillips	29,559	13,190
Cascade	None	17,630	Pondera	11,059	10,527
Chouteau	40,805	12,166	Powder River	13,913	5,123
Custer	27,768	17,003	Powell	11,002	3,300
Daniels	16,268	6,427	Prairie	13,905	9,966
Dawson	27,425	13,340	Ravalli	25,421	11,310
Deer Lodge	31,316	9,860	Richland	28,499	11,628
Fallon	19,685	8,238	Roosevelt	16,931	2,801
Fergus	65,141	15,342	Rosebud	37,196	15,666
Flathead	48,249	25,819	Sanders	35,590	14,488
Gallatin	52,954	27,668	Sheridan	32,756	12,668
Garfield	25,585	9,551	Silver Bow	16,431	None
Glacier	7,294	3,573	Stillwater	67,997	10,675
Golden Valley	11,494	5,563	Sweet Grass	9,289	4,719
Granite	15,994	5,139	Teton	30,309	3,023
Hill	24,322	18,472	Toole	23,101	5,390
Jefferson	17,925	7,152	Treasure	4,464	2,170
Judith Basin	36,025	4,041	Valley	32,784	16,232
Lake	18,392	7,590	Wheatland	12,320	None
Lewis and Clark	29,138	10,233	Wibaux	10,056	2,568
Liberty	11,331	2,774	Yellowstone	24,461	None
Lincoln	28,844	13,125	Petroleum	18,490	7,575
Madison	28,017	5,697			
McCone	24,547	9,819			
				\$1,379,367	\$561,289

Table Prepared by State Board of Equalization.

AVERAGE ASSESSED VALUATION OF MONTANA LANDS

Year	Irrigated	Lands Non-irrigated Ag- ricultural Lands	Grazing Lands
1925	\$50.95	\$13.44	\$ 4.96
1924	52.37	13.97	5.39
1923	51.15	13.47	6.08
1922	51.38	12.65	6.51

WEALTH PER CAPITA IN MONTANA IN 1922 AND 1912

1912	1922
\$2,792	\$3,691

OIL AND PETROLEUM



Development Assumed Commercial Proportions Six Years Ago—Production in 1925 Valued at More Than Six Million.



On August 10, 1864, a United States army wagon lumbered along the "Boze-man Cutoff," on a saddle of the Prior Mountains, in what is now the State of Montana. Suddenly the wagon hit a large boulder—a wheel was out of repair. In searching for water the skinner found a large pool covered with oil. He se-cured enough to fill his grease can, and being a methodical sort of fellow, recorded his discovery. The presence of oil in various parts of the state was later noted by many pioneers, but this was the first written record of petroleum. By a singular coincidence this first discovery of oil was within a few miles of the spot where the Soap Creek field is now located.

It was 55 years before development assumed commercial proportions. On November 6, 1919, oil in commercial quantities was encountered in the Devils Basin, about 20 miles north of Roundup.

J. P. Rowe, head of the Department of Geology at the University of Montana, has prepared the following description of the oil and petroleum fields of today:

By J. P. Rowe.*

There are at present seven rather distinct fields or localities in Montana pro-ducing petroleum, and seven distinct localities producing enough natural gas to be of commercial value.

KEVIN-SUNBURST PIPELINE RUNS FOR 1925
By Quarters

	Barrels
January	359,575.28
February	
March	
April	534,154.60
May	
June	
July	815,975.69
August	
September	
October	1,027,232.79
November	
December	
	2,736,938.36

CAT CREEK PIPELINE RUNS FOR 1925
By Months

	Barrels
January	114,686.61
February	99,275.78
March	105,163.37
April	101,613.86
May	109,226.92
June	105,296.77
July	104,089.19
August	106,301.05
September	99,594.88
October	98,736.60
November	93,404.86
December	97,066.33
	1,234,456.22

*Engineering and Mining Journal-Press, New York.

OIL PRODUCTION—1921 TO 1925 INCLUSIVE

	1921	1922	1923	1924	1925	Total
CAT CREEK:						
Number Producing Wells.....	56	97	141	179	186	
Number Barrels Produced.....	1,350,528.91	2,201,917.04	2,080,826.12	1,529,202.19	1,234,456.28	8,396,930.54
Value.....	\$2,085,296.97	\$3,366,529.58	\$3,360,785.79	\$2,439,277.76	\$2,419,135.79	\$13,671,025.89
KEVIN-SUNBURST:						
Number Producing Wells.....	.....	27	146	220	438	
Number Barrels Produced.....	.....	28,987.48	441,531.48	1,187,404.84	2,736,938.36	4,394,862.16
Value.....	.....	\$ 40,582.49	\$ 309,072.03	\$1,168,329.95	\$3,944,258.10	\$ 5,462,242.57
LAKE BASIN:						
Number Producing Wells.....	.....	.....	.....	.....	2	
Number Barrels Produced.....	.....	.....	.....	.....	23,590.27	23,590.27
Value.....	.....	.....	.....	.....	\$ 49,828.81	\$ 49,828.81
BLK BASIN:						
Number Producing Wells.....	(est.) 18	18	18	18	18	
Number Barrels Produced.....	75,178.86	47,011.10	28,085.30	24,019.14	21,286.46	195,380.95
Value.....	\$ 128,370.27	\$ 75,895.92	\$ 45,250.45	\$ 39,280.87	\$ 51,144.39	\$ 339,941.90
SOAP CREEK:						
Number Producing Wells.....	5	5	1	*	*	
Number Barrels Produced.....	14,719.66	27,134.80	1,960.00	.....	.....	43,814.46
Value.....	\$ 7,982.81	\$ 14,831.65	\$ 980.00	.....	.....	\$ 23,794.46
DEVIL'S BASIN:						
Number Producing Wells.....	1	1	1	1	*	
Number Barrels Produced.....	3,047.00	1,363.50	753.00	105.00	.....	5,268.50
Value.....	\$ 6,094.00	\$ 2,727.00	\$ 972.00	\$ 157.50	.....	\$ 9,950.50
ALL FIELDS:						
Number Producing Wells.....	62	130	293	400	626	
Number Barrels Produced.....	1,443,474.43	2,306,413.92	2,553,155.99	2,740,731.17	4,016,271.37	13,060,046.88
Value.....	\$2,227,744.05	\$3,500,566.64	\$3,717,060.27	\$3,647,046.08	\$6,464,367.09	\$19,556,784.13

Table prepared by State Board of Equalization.

*Field Shut Down.

The oil fields are as follows, given in order of discovery: (1) Elk Basin, Carbon County (1915); (2) Devil's Basin, Musselshell County (1919); (3) Cat Creek, Petroleum County (1920); (4) Soap Creek, Big Horn County (1921); (5) Kevin-Sunburst, Toole County (1922); (6) Genou, Chouteau County (1923); (7) Lake Basin, Stillwater and Yellowstone Counties (1924).

The gas fields here given are also in order of their discovery: (1) Glendive, Dawson County, included in the Cedar Creek anticline (1913); (2) Havre, Hill County (1915); (3) Baker, Fallon County, included in the Cedar Creek anticline; (4) Cabin Creek, Fallon County, included in the Cedar Creek anticline; (5) Elk Basin, Carbon County (1915); (6) Sweet Grass Hills, Toole County (1915); (7) Kevin-Sunburst, Toole County (1922); (8) Bowes Structure, Blaine County.

A brief discussion of each field will herein be given. This discussion will embrace the geology, area, general development and such other topics that the writer believes will be of general interest and value to the reader.

Elk Basin.

The Elk Basin field or structure is an elongated dome with dimensions of about one mile by one-half mile within the basin, with fairly steep dipping strata, dipping away from the basin on all sides (qua qua versal). In fact, the top of the dome has been etched into a basin by erosion.

This field lies partly in Wyoming and partly in Montana. According to Trumbell, former State Geologist of Wyoming, it was drilled during the fall of 1915 and oil found in two of the Frontier sands. The Frontier is middle Colorado of the upper Cretaceous. "The pool is about 400 acres only, in size." A six inch pipe line 30 miles long connects the field with Frannie, a town on the C., B. & Q. railroad.

The altitude of this field is about 3,400 feet and the depth to the oil sands is about 900 feet.

There are only two wells producing in this field that are in Montana territory; they are Elk No. 9, and Mack No. 11. The others are in Wyoming. The oil is rather high in gasoline and kerosene, and when the wells were first brought in much gas escaped with the oil. The casing head gas is now, however, turned into casing head gasoline. When the wells were first brought in, they were flowing, but soon had to be pumped. This field is still a fairly good producer as the following production furnished by C. W. Gross of the Montana State Board of Equalization will show:

1921	24,350 barrels	
1922	13,571	"
1923	9,696	"
1924	6,452	" valued at \$10,448.

The Wyoming production from this field in 1923 was 646,780 barrels.

Devil's Basin.

While this locality has never produced commercial petroleum, enough has been found to show it a commercially possible locality. According to Lambert "the well drilled by the Tri-City and Van Duzen Oil Companies in Section 29, T. 8N., R. 21E., on the Woman's Pocket anticline went through the red beds of the Kootenai formation and found a little heavy black oil in the underlying Quadrant (Pennsylvania) sands. In November, 1919, the Van Duzen 'Discovery Well' in Devil's Basin, Section 24 T. 11 N., R. 24 E., found showings of oil in the Quadrant.

The drilling operation that is now being done or that has recently been done in this field is here shown:

Lincoln Oil Company, deep test—NW.¼ of SW.¼ 25-11-24 E., now drilling at 800 feet.

A. B. C. No. 3—NE.¼ 26-11-24, now shut down. Depth, 1,000 feet.

"56" Petroleum No. 1—SE.¼ NW.¼ 9-11-24, shut down. Depth, 2,500 feet.

Adams Land Company—NW.¼ SE.¼ 24-11-24, S. D. oil. Depth, 1,200 feet.

Absaroka Oil Dev. Co.—SE.¼ NW.¼ 9-11-24, 2,080 feet.

Alberta Block Coal Company No. 2—SE.¼ NE.¼ 26-11-24, shut down. Depth, 1,460 feet.

Cat Creek, Petroleum County.

This is the third field in Montana to discover oil and the second real commercial producer. The crude from the Cat Creek field is very high in the light oils such as gasoline, naththeline, kerosene, etc., and was discovered or entered to producing rank in the spring of 1920.

The structure in which the "Discovery Well" was sunk is known as the Mosby dome. This structure is a part of the Cat Creek anticline, which is made up of a number of domes. The anticline proper runs in a northwest-southeast direction from the middle of Township 14 N., Range 31 E., to and beyond Black Butte, T. 17 N., R. 23 E. The longest bulge in the anticline is situated at its eastern end and is composed of three domes, known as the East Mosby, Mosby, and West Mosby domes. The other domes lying west on this anticline are Oiltana dome, Brush Creek dome, Kootenai dome, and Black Butte dome. According to Clapp, the Colorado shales are exposed in all these structures except the Kootenai dome, which shows Kootenai outcrops.

The writer has visited all the secondary structures or domes on the Cat Creek anticline and the top of each dome has been etched by erosion, leaving a depression and making rather prominent escarpments of sandstone on each side. The northeast escarpment has, in nearly all localities, a steep dip, running as high as 35° or more. The southwestern limb has a more gentle dip, although usually several degrees.

The oil is found in the Kootenai sands. Up to August 25, 1925, there were 121 producing wells in the first sand and 43 producing wells in the second sand. There are now in this field 10 wells either being drilled or preparing to drill. The wells that are now being drilled are for the most part in T. 15 N., R. 29 E.; although there is one being drilled in T. 14 N., R. 28 E.; one in 15-28; and one in 15-30. At present there is one well at a depth of 2,400 feet and still drilling; while the first sand is between 1,200 and 1,300 feet from the surface. Pipe lines from the field to Winnett, about 20 miles, convey the oil to the Chicago, Milwaukee and St. Paul railroad, where it is shipped to local and other refineries.

The gasoline made by local refineries from the Cat Creek crude must be blended with casing head gasoline to bring it up to standard.

The output from this field in 1924 was 1,529,202 barrels, valued at \$2,439,277.

Soap Creek.

In 1921, the Soap Creek anticline in Big Horn County, south of Hardin, became a producer. This structure is in the Crow Indian Reservation, and oil was struck in the Quadrant sands about 1,650 feet below the surface. The oil is a heavy, black variety, similar to the oil from the Lander, Wyoming, field which probably comes from the Pennsylvanian formation. The structure is not large and, due to this fact and the lack of transportation facility, not much crude has

been produced. State reports show that 1,960 barrels were produced in 1923, valued at \$980, while no production is given for 1924. The latest report gives five Western States wells producing, but no activity in the way of drilling.

Kevin-Sunburst.

The first well in this field was brought in March, 1922. The well is known as the Gordon Campbell discovery well and is located in Section 16, T. 35 N., R. 3 W. This well had a flow of gas, from 500,000 to 1,000,000 cubic feet per day, from a sand near the base of the Colorado. It also found a showing of oil in the Sunburst sand at the base of the Kootenai formation, and about 200 feet above the Madison limestone, and yielded a few barrels of oil a day from the basal "sand" of the Ellis formation, just above the massive Madison limestone, which was reached at a depth of 1,770 feet. The well stood idle from March until June, 1922, when about 100 barrels of oil was pumped from it in one day. Its initial yield is estimated at 5 to 10 barrels a day.

The Sunburst well, in Section 34, T. 36 N., R. 2 W., was completed early in June, 1922. It encountered gas in the sand near the base of the Colorado shale and oil in the Sunburst sand, which is here 200 to 250 feet above the basal "sand" of the Ellis formation and was struck at a depth of 1,550 feet. The first day of steady pumping yielded about 200 barrels. After a month of steady pumping the well was estimated as good for 50 barrels a day, and it was still being pumped in the summer of 1925.

Since 1922 over 700 wells drilled on the Kevin-Sunburst dome have been listed in the bulletin of the Northern Oil Information Bureau, which is published weekly at Shelby, Montana. Most of the wells on the north side of the dome, if drilled to the basal "sand" of the Ellis, show at least traces of oil or gas in one or more of the sands, and most of them have been oil producers, whereas those on the south side have yielded gas usually from the Sunburst or higher sands and very small traces of oil, if any. The south side of the dome has not been tested sufficiently to tell whether there is any other reason for this condition than the varying porosity of the basal "sand" of the Ellis.

In 1923 the largest producers were in the northern part of T. 34 N., R. 2 W., near the north line of Section 9. In 1924 a large part of the production came from the vicinity of Section 4, T. 34 N., R. 2 W., and in 1925 the drilling of some large wells in Sections 29, 30, 31, and 32, T. 35 N., R. 1 W., has helped to raise the total production of the field. The field is being drilled most actively in the neighborhood of the more successful wells, and the areas are being expanded, but other large centers of production may be struck at any time, and the peak of production will probably not be reached for several years.

To date oil and not gas has been the objective of exploration in the Kevin-Sunburst field, but even so an important gas field has been found to exist on the south side of the dome, and considerable quantities of gas are also being produced along with the oil from areas further north. Gas produced south of the oil field is now being used as domestic fuel in the town of Shelby, and in the field itself gas is being used as fuel for drilling. The demand for gas will undoubtedly continue to increase, with profit to producers, provided that wells are carefully drilled and cased, and that the gas is used only for essential purposes.

Character of the Oil.

The oil from the Sunburst sand has a dark color, an odor like that of gasoline, and a gravity of about 35 degrees Baume. That from the basal "sand" of the Ellis formation is nearly black and has an odor of sulphur and an average gravity of about 30 degrees Baume, known analyses varying from 27½ degrees to 34 de-

grees Baume. As most of the oil produced comes from the latter "sand," the grading of price according to gravity test has not as yet been applied. The present posted price of Kevin-Sunburst crude is \$1.35 a barrel.

Part of the above has been taken from a recent report by Collier and Boyer.

The Kevin-Sunburst district lies in Toole County, about 20 miles north of Shelby and 10 miles south of the Canadian boundary, at Sweetgrass. It is a part of the Sweetgrass Arch. According to Stebinger, in Bulletin Number 641 of the United States Geological Survey, this structure is characterized by a very broad anticline, or arch, that extends in a general northerly direction. This broad uplift brings the Colorado shale to the surface in the area about 75 miles wide, surrounded on all sides but the south by outcrops of the Vergells sandstone (Eagle). The arch extends southward from the Sweetgrass Hills to the region beyond Teton River, when it flattens out because of the presence of gently northward dips induced by the uplift of the Belt Mountains, still farther south. On the north this broad uplift extends to and beyond Belly River, in Alberta, but it pitches slightly, allowing the overlying rocks of the Montana group to arch over its crest. On the geologic maps of southern Alberta it appears as a broad belt of "Belly River beds," flanked on each side by the overlying marine shale. The Bow Island gas field of southern Alberta lies in the center of this broad arch.

In 1922 the United States Geological Survey sent out two of their geologists, Messrs. A. J. Collier and W. W. Boyer, and made a careful survey of the Kevin-Sunburst oil field, and sent out a press notice bulletin on September 7 of that year.

The Campbell well is lower Ellis (Jurassic) and the Sunburst well is lower Kootenai. The structure of the Kevin-Sunburst field is a low dip. The highest point on the structure is but 500 above the Campbell well, although it is 10 miles away.

The above report states that: "It is not to be expected that this broad dome will be productive throughout. A number of distinct pools may be found on it, their locations having been fixed by particularly favorable conditions of porosity and possibly by minor crumpling in the oil-containing formations. The formations include the Colorado, Kootenai, Ellis, Madison and perhaps the underlying Devonian."

The same writers conclude: "The discovery of oil in the comparatively flat-lying strata of the Sweetgrass arch shows that sharp anticlinal folds are not absolutely essential for the accumulation of oil in the Rocky Mountains. There can remain no doubt that gentle folds, such as those that yield oil in the mid-continent region, should be examined, particularly for oil in strata older than Cretaceous." They suggest that if the Kevin-Sunburst area proves to be an extensive and valuable oil field, regions of similar structure (low dip) in Montana such as the Bowdoin dome in Valley and Phillips Counties and the Porcupine dome in Rosebud County should be thoroughly prospected.

Since the above was written there have been many successful wells drilled in the Kevin-Sunburst field. On November 7, 1925, there were 407 producing oil wells, and 28 producing gas wells in this district. For the most part, the producers are in Townships 35 and 36 North and Ranges 1 and 2 West.

Since Collier and Boyer recommended the thorough prospecting of low dipping structures in Montana, such as the Bowdoin dome and the Porcupine dome, considerable drilling has been done on both of these structures. The Homestake Oil Company, one of the best independent producers in Montana, drilled two wells, one of which reached a depth of 2375 feet. The results were negative. The

Bowdoin Oil and Gas Company drilled to a depth of 3,150 feet, with apparently the same results.

There have been several wells drilled to various depths on the Porcupine dome. The deepest reached a depth of 2,300 feet. So far as can be learned, none of the wells drilled on this structure has been successful.

The last news from the Kevin-Sunburst field was to the effect that the Fulton Oil Company just completed the biggest well that was ever struck in this locality. The well is on the famous William Byrne lease, number 8 location, and its exact locality NW $\frac{1}{4}$ of Section 31, Township 35 N., Range 1 W. While no accurate test of the amount of oil this well would produce was made, it filled a 250 barrel tank in 25 minutes; at this rate it would yield 12,000 barrels per day.

Genou, Cheuteau County Field.

In the spring of 1923 a report went out that a good well had been brought in near Genou. Nothing since has been reported. The Northfield Reliance No. 1 reached a depth of 2,800 feet, but is now abandoned. This is within the Sweet-grass arch, but several miles east of the producing area of the Kevin-Sunburst field. It is put down here as only a reported producing area, although since the first report nothing definite has come from this locality.

Lake Basin Field, or Big Lake Anticline—History.

The United States Geological Survey Bulletin 691, page 144, mentions a well drilled in 1902 in 17-3N.-21E. in the Hailstone Basin. This well started in the Colorado, was drilled to a depth of 1,426 feet, and abandoned. Showings of oil and gas were encountered at 932 and 1,037 feet.

In 1921 there were three wells drilled in this area. The Harrison Oil and Gas Company drilled in 21-1S.-21E., Antelope Point, starting in the Judith River formation and stopping in the Colorado at an approximate depth of 3,200 feet. A showing of oil was found in the Colorado, but the well was abandoned.

The Barnsdall-Foster Company drilled in SE. SE. NE. 34-2N.-21E., Battle Butte, starting in the Bearpaw and stopping in the Eagle at a depth of 1,150 feet. One-half million feet of gas was encountered in the Eagle formation, which caught fire, destroying the rig. Hole was abandoned.

The Molt well in SW. SW. NW. 5-3-21E. started in the Colorado and stopped in the Ellis at a depth of 3,000 feet. No showings of oil were encountered. Warm fresh water was encountered at 3,000 feet and well was abandoned.

In 1922 the Barnsdall-Foster Company drilled their second well on Battle Butte structure in SW. SW. NW. 35-2N.-21E., starting in the Bearpaw and stopping in the Kootenai at a depth of 4,050 feet. A show of oil was found in the Eagle formation at 1,150 feet and gas was encountered in the Colorado, but the casing was pulled and the well abandoned.

This same company then drilled in the NE $\frac{1}{4}$ of 35-1N.-21E. Well started in the Bearpaw and was stopped in the Eagle when two million feet of gas were encountered. Well was capped.

Harrison et al. drilled near Columbus in 30-2S.-21E., Big Lake; well started in the Judith River formation and was abandoned after reaching the Colorado at 1,125 feet.

The Church well in NE. NE. NW. 26-2-21E., Big Lake, started in the Judith River formation and was abandoned in the Eagle at 1,200 feet. A showing of oil was encountered.

The discovery well in this area is the Hepp No. 1 in NE.¼ of Section 26-1N.-21E., which was brought in on Monday, May 12th, 1924, by the Midwest Refining Company.

Big Lake Anticline.

The Bearpaw shale is the predominate surface formation of this region. The wells producing petroleum and natural gas so far are located largely in Section 26, Township 1 North and Range 21 East. Natural gas in commercial quantity was struck in a well in Section 35, Township 1 North, Range 3, 21 East. The producing oil wells are all fairly deep, ranging from 2,920 feet to 3,896 feet. Up to January 2, 1926, there were three producing wells reported. The production is shown below.

It is claimed that the discovery of this field was made possible by the work of C. Max Bauer, Chief Geologist of the Midwest Refining Company.

It is claimed that Big Lake has an established enclosure of 1,000 feet. There are three and possibly four probable producing horizons within reach of the drill. The present production is claimed to be coming from the Dakota sand (probably Kootenai). The future of this field looks bright.

Montana's Total Oil Production.

The commercial production by fields aad months for the year November 1, 1924, to November 1, 1925, is given below:

		Cat Creek	Kev.-Sunb.	Lake Basin	Total
November,	1924.....	127,943	100,309	.....	228,252
December,	1924.....	117,585	95,130	.....	212,715
January,	1925.....	132,371	110,535	.....	242,852
February,	1925.....	123,491	108,666	.....	232,157
March,	1925.....	135,837	107,430	.....	243,267
April,	1925.....	122,018	118,372	.....	240,390
May,	1925.....	99,736	157,749	.....	257,485
June,	1925.....	118,244	194,215	.....	312,459
July,	1925.....	105,484	225,024	8,221	339,329
August	1925.....	96,790	258,112	12,126	367,028
September,	1925.....	104,101	262,070	2,208	368,379
October,	1925.....	98,560	349,442	737	448,739
		1,382,106	2,087,054	23,892	3,493,052

The greatest production of petroleum in Montana in a single day was 18,750 barrels, produced during the week of November 28, 1925.

The following shows Montana's oil production since other fields than Elk Basin have been producing. The production for the years 1921 and 1922 were largely from Cat Creek, although Elk Basin gave its quota:

FIELD	1921	Barrels	Value
Elk Basin and Cat Creek.....		1,509,000	.....
	1922		
Elk Basin and Cat Creek.....		2,449,000	.....
	1923		
Cat Creek		2,080,826	\$3,360,785
Kevin-Sunburst		441,531	309,072
Devil's Basin		753	972
Elk Basin		9,696	15,801
Soap Creek		1,960	980
Total.....		2,534,767	\$3,687,611
	1924		
Cat Creek		1,529,202	\$2,439,277
Kevin-Sunburst		1,187,404	1,168,329
Devil's Basin		105	157
Elk Basin		6,654	10,448
Total.....		2,723,365	\$3,618,211

Montana crude is rather widely scattered for refining purposes. Besides supplying the independent refineries of the state (see list below), it is sent to Whiting, Indiana; Crowley and Lovell, Wyoming; Minneapolis, Winnipeg and several other places outside of Montana.

MONTANA INDEPENDENT OIL REFINERIES

Name of Refinery	Location	Year Constructed
Akscher Refinery	Near Kevin .....	.....
Arro Oil & Refining Co.	Lewistown	1921
Hart Refineries	Hedgesville	1922
Hart Refineries	Missoula	1924
Homestake-American Refining Co.	Great Falls	1923
Kalispell Oil & Refining Co.	Kalispell	1924
Lewistown Oil & Refining Co.	Lewistown	1921
Kevana or Montana Giant Refinery	Kevin	1923
Montana Refining Co.	Billings	1921
Northern Star Oil & Refining Co.	Sunburst .....	.....
Reliance Refining Co.	Kalispell	1924
Roundup Refining Co.	Roundup .....	.....
Snow Cap Oil Co.	Sunburst	1923
Sunburst Refining Co.	West Great Falls	1923
Weona Refining Co.	Winnett	1921
Yale Oil Corporation	Miles City	1922

NATURAL GAS.

Cedar Creek Anticline, Glendive District.

According to the United States Geological Survey, "The first production of gas in Montana was from Dawson County, near Glendive (T. 15 N., R. 55 E.), when in 1913 a well owned jointly by the Consolidated Oil and Gas Company and the Mid-West Oil Company was drilled to a depth of 2,345 feet, and at a depth of 840 feet gas was obtained, and two more light flows were found lower down. The estimated production of this locality was 1,000,000 cubic feet per day. The production from the Glendive field doubtless comes from the Judith River formation.

Several additional wells were drilled near Glendive and the gas was piped to the city and used for domestic purposes.

Baker District.

Commercial natural gas was later struck at Baker, Fallon County, and also about half-way between Glendive and Baker, at Cabin Creek. Little development has been done at the latter place, although the last report gave 13 producing gas wells near Baker. The gas near Baker is piped to the city for domestic purposes and sells for 30 cents per 1,000 cubic feet. Baker uses about 100,000,000 cubic feet per year. The gas at this locality (Baker) is also used by the Gas Products Company for making Carbon black. The Carbon Black Company is located about one mile from Baker. The company makes about two tons of Carbon black daily and consumes about 2,000,000 feet of gas in the process.

Havre District.

The second locality in Montana to discover natural gas was Havre. In July, 1915, a well in SE.¼ of Section 33, T. 33 N., R. 16 E., was brought in, and the production estimated at 1,000,000 cubic feet in 24 hours. Other wells have been brought in since. The gas comes from the Eagle sandstone.

Sweetgrass Hills District.

As early as 1914 wells were drilled in this district, and some gas struck. It is claimed that a well drilled during 1916 struck a flow of gas estimated at 4,000,000 cubic feet per day. This well started in the Two Medicine formation and the gas was struck in the basal Colorado sandstone. This well was drilled to a depth of 1,860 feet.

Conrad and Shelby District.

This district is in the Sweetgrass arch and closely associated with the Kevin-Sunburst oil district. At present there are 28 gas wells in this field. The city of Shelby uses about 100,000,000 cubic feet of gas per year. The wells are located six miles from the city on the NW $\frac{1}{4}$ of Section 6, T. 32 N., R. 1 W.

Bowes Structure.

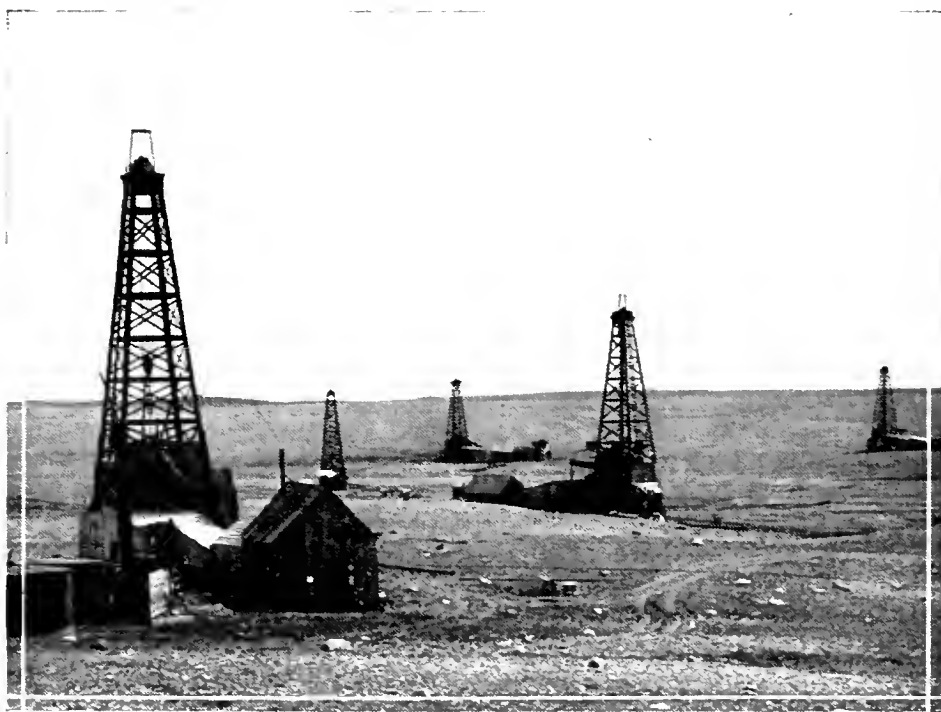
This structure is in Blaine County, and about 10 miles south of Chinook, the county seat. According to a recent issue of the Montana Oil Journal this structure "consists of 3,000 acres of proved gas sand with two completed wells having a flow of 44,000,000 cubic feet daily. According to competent engineers, the field is capable of producing 50,000,000 cubic feet daily for 15 years." There is a movement on foot to pipe this gas to Havre, Big Sandy, Fort Benton, and Great Falls. The building of 130 miles of 12½-inch pipe line is contemplated.

Elk Basin.

Not long ago the cities of Billings, Bridger, Laurel, and others near by were fortunate to have a one-inch pipe line bring gas from Elk Basin and replace the artificial, especially in Billings. The pipe line to Billings is 68 miles long. Artificial gas sells from \$1.70 to \$2.20 per 1,000 cubic feet in Montana cities, with a heat value of about 500 B. T. Us per cubic foot. In Billings, where the natural gas has replaced the artificial, the price is 50 cents per 1,000 cubic feet to householders and 35 cents per 1,000 for commercial use. The heat value of the natural product is nearly twice that of the artificial. When one compares the price and heat value of the two, it is not hard to figure out the great value of natural gas to any community that is fortunate enough to secure it.

Billings has over 3,400 consumers and uses about 1,000,000,000 cubic feet of gas per year.

According to Albert B. Bartlett, State Geologist of Wyoming, this field produces a considerable amount of natural gas and also casing head gasoline. He says: "There is a gas line to Billings and other points in Montana. The Mid-West Refining Company has a plant for treating casing head gas capable of



In a Montana Oil Field.

handling 1,500,000 cubic feet of gas per day and securing the extraction of 6,000 gallons of gasoline per day." This means, of course, that the casing head gas yields four gallons of gasoline per 1,000 cubic feet.

The United States Geological Survey in Mineral Resources of the United States for 1921 mentions two other fields, as follows: The Cone Butte dome, Fergus County, and the Lake Basin dome, Stillwater County. Very little is known of the Cone Butte dome by the writer, but the Lake Basin or Big Lake structure reports five wells from which more or less gas comes. The largest of these gas wells is in Section 35, T. 1 N., R. 21 E. A production of 2,000,000 cubic feet per day is claimed for this well.

There are many other localities in Montana where more or less gas has been struck while drilling for oil. Some of these are located as follows:

Broadview dome—Section 13, T. 3 N., R. 22 E.

Cherry Ridge—Section 5, T. 35 N., R. 21 E.

Mosher Dome—Section 34, T. 38 N., R. 24 E.

Sherard or Birch Creek structure—Section 17, T. 25 N., R. 17 E.

Without much comment one can see a fairly good future in Montana for both oil and gas. The writer does not look to see Montana a second California in production, but does believe that the State will have a material increase over its present production, and be a good producer for some time to come.

GASOLINE MANUFACTURED AND USED IN MONTANA—1923, 1924 AND 1925

	Manufactured in State Gallons	Manufactured and Sold Out of State Gallons	Imported Into State Gallons	Net Used in State Gallons
1923—				
1st Quarter	1,548,432	11,500	2,909,023	4,445,955
2nd Quarter	2,190,311	.....	5,722,500	7,912,811
3rd Quarter	3,444,275	.....	8,519,830	11,964,105
4th Quarter	4,489,216	608,595	3,953,121	7,833,742
TOTAL 1923	11,672,234	620,095	21,104,474	32,156,613
1924—				
1st Quarter	3,915,744	1,069,467	1,898,119	4,744,396
2nd Quarter	7,230,434	1,649,179	2,592,386	8,173,641
3rd Quarter	8,862,531	1,234,673	5,022,347	12,650,205
4th Quarter	6,013,503	1,020,594	3,824,110	8,817,019
TOTAL 1924	26,022,212	4,973,913	13,336,962	34,385,261
1925—				
1st Quarter	5,064,526	974,373	1,424,795	5,514,948
2nd Quarter	8,627,966	1,529,918	3,358,487	10,456,535
3rd Quarter	10,575,728	950,360	5,088,131	14,713,499
4th Quarter (est.).....	7,682,368	1,139,575	2,351,431	8,894,224
TOTAL 1925	31,950,588	4,594,226	12,222,844	39,579,206

Table prepared by State Board of Equalization.

MONTANA REFINERY GASOLINE PRODUCTION 1925

Company	Gallons
Lewistown Oil & Refining Company.....	15,017,234
Arro Oil & Refining Co.	8,142,580
Sunburst Refining Co.	3,938,329
Miles City Refining Co.—Yale Oil Corp.	2,189,091
Weowna Refining Company	101,560
C. W. Hart Refineries	1,064,196
Absher Refining Co.	98,902
Montana Giant	865,657
Snow Cap Co.	60,463
Silver Bow Refining Co.	302,087
Kalispell Oil & Refining Co.	47,714
Reliance Refining Co.	74,370
	31,902,183

Table prepared by State Board of Equalization.

AUTOMOBILE REGULATIONS



*Montana's Motor Restrictions Are Only Common Sense Restrictions—
Tourists Not Required to Have Licenses for Temporary Sojourn.*



Restrictions in Montana's motor vehicle laws are not irksome to tourists. Non-resident owners of motor cars, temporarily sojourning in Montana, are not required to obtain licenses in this State, nor to register their cars.

Speed Regulations.

Under the State law there is no fixed speed rate per mile, the requirement being that chauffeurs drive in a careful and prudent manner, so as not to endanger the life, limb, property or other rights of any person. Cities and towns have the right to regulate speed and traffic upon the streets. In a majority of the cities the rate is not to exceed 12 miles an hour. Traffic must everywhere and at all times keep to the right. Moving in the same direction, the vehicle passing must turn to the left, and the one being passed to right. No motor vehicle is allowed to pass a street car which has stopped to receive or discharge passengers at a less distance than eight feet, nor at a speed greater than six miles an hour.

Accessories Required.

The State motor law requires that every motor vehicle operated on the public highways shall be provided with two sets of independently operated brakes in good working order, either one of which must be sufficient to stop the drive wheels of the car and prevent them from turning while the car is in motion. A horn or other device for signaling must also be a part of the equipment. Between one hour after sunset and one hour before sunrise every motor vehicle of the three or four wheeled type must display two lights in front, one on each side, and one light in the rear. Motor vehicles of the two wheeled type must display one white light in front and one light in the rear, the rear lights in both classes of vehicles must display red rays visible to the rear and throw white light upon the number plate carried on the rear, so that the number may be visible at a distance of 100 feet. The light of the front lamps shall be visible at least 200 feet in the direction in which the vehicle is proceeding.

The law states: "The front lights of all motor vehicles shall be equipped with some style of non-glare dimmers by which the intensity of such lights are diminished; and it shall be unlawful for the driver of any motor vehicle in the State of Montana to display on the front of such vehicle lights of such a degree of brightness as tend to confuse drivers of vehicles coming in contact with or moving in an opposite direction from such motor vehicle."

Violations are punishable by a fine not exceeding \$100.00.

U. S. INTERNAL REVENUE RECEIPTS IN MONTANA, YEAR ENDED JUNE 30, 1925

Income Tax	Miscellaneous Taxes	Total
\$1,885,190	\$564,377	\$2,449,568

INCOME TAX RECEIPTS, MONTANA, YEAR ENDED JUNE 30, 1925

Corporation	Individual	Total
\$1,977,823	\$807,366	\$2,785,190

PERSONAL (NET) INCOME IN MONTANA, 1921-22-23 (Data by Internal Revenue Bureau)

1923	1922	1921
\$106,035,884	\$83,903,851	\$81,527,662

Montana's Recreational Resources



To all classes of people Montana presents a peculiar appeal at the time when the lengthening and drowsy days of summer send forth their irresistible call for outdoors.

To the world-weary her mountains beckon that they may come forth and renew life at Nature's own springs. To those who would get away from the worries and cares of routine existence and seek

primitive comfort and health-giving relaxation amidst unusual scenes, Montana's deep forests and placid lakes offer inviting retreat. To the red-blooded who care to track big game, or battle with the fighting trout, Montana's best is America's best.

The Treasure State's recreation resources again illustrate the bigness of the State. Yellowstone and Glacier National Parks—what other commonwealth offers the recreational variety of Montana? And Yellowstone and Glacier are but two of the best known of hundreds of Montana's playgrounds.

For the Summer Vacation.

Montana has an historic background that provides the tourist with an interest that never wanes; scenes of early-day exploration, sanguinary Indian battles, military posts and fur trading centers, of Indian missions, of gold discoveries; places along the way made notable by stirring events in the emergence from an uncharted wilderness to a modern commonwealth. There isn't a monotonous mile in the journey by rail or motor through Montana.

Montana summer weather is almost perfect; no destructive tornadoes, few violent electrical storms, warm days tempered by mountain breezes, cool nights that bring refreshing rest.

It is a pleasant change to leave the humid lower altitudes and find soothing ease among Montana's mountain resorts; every condition is here to satisfy the urge to get back for a time to elemental things and build up strength and refreshen the spirit to meet the world's tasks when vacation days come to an end. The following pages describe briefly a part of Montana's recreational resources.

HISTORIC SCENES



Location of Scenes of Early Day Adventures Are of Interest and Many Are on or Adjacent to Tourist Highways.



In many places throughout the State are scenes made memorable by men who "walked their hour upon the stage" in the early morning of Montana history; explorers, fur traders, military leaders, scientists, missionaries.

The names of the Verendrye brothers, Pierre and Chevalier, are connected with the Big Horn and Powder River regions. The Great Falls of the Missouri, the upper reaches of the Marias, the Gate of the Mountains, and the Three Forks of the upper Missouri were given consideration in the journal of Lewis and Clark. Yellowstone Lake will recall the explorations of John Colter. The Bridger range that walls the garden valley of the Galatin is a monument to the memory of Jim Bridger, the echoes of whose fame were awakened by the publication of Emerson Hough's "Covered Wagon." The names of Major Culbertson and Kenneth McKenzie are linked with the establishment of fur trading posts on the Marias, Teton and Missouri Rivers near Fort Benton, and it was the former who

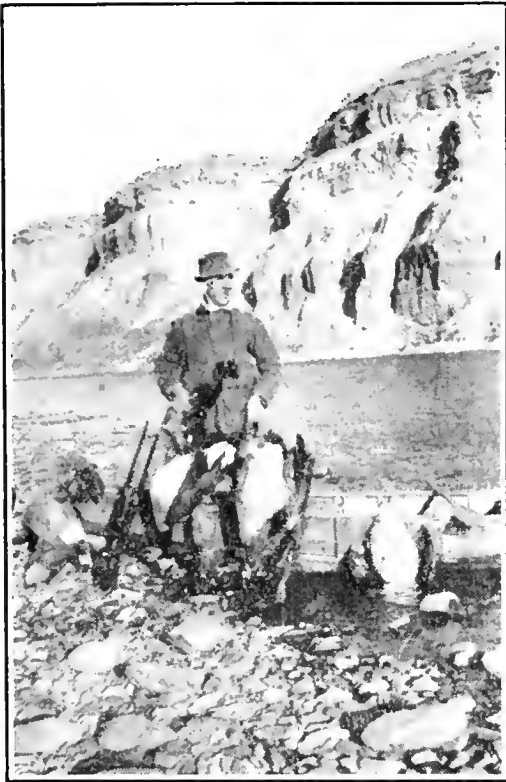
gave most encouragement to the scientific investigations of the famous naturalist, Audubon, when he visited the State. The Little Big Horn country is notable as the spot where the brave Custer and his faithful followers were slain by Sioux warriors, and in the Bearpaws, in northern Montana, was fought the last fight of Chief Joseph of the Nez Percés, who surrendered to General Nelson A. Miles.

Many of these scenes of outstanding early day adventures are on or adjacent to tourist highways. (See chapter on the History of Montana.)

HUNTING AND FISHING



Thirty-Three Game and Bird Preserves Furnish a Retreat and Replenish Adjacent Hunting Grounds.



Twenty Miles Above Fort Benton.

Hunting and fishing are among Montana's most noted attractions. Sportsmen assert there is more big game in Montana than anywhere else within the continental limits of the United States. Bear, elk, and deer are found in the mountainous portions of the State, and trout in the mountain streams. Sage hens and prairie chickens are found in eastern Montana. In almost every part of the State there are lakes where good wild fowl hunting is to be had in season. There are 33 game and bird preserves in Montana which furnish a retreat to the wild game and serve as breeding grounds to replenish the game in the adjacent hunting areas.

Cost of License.

Montana has stringent game and fish laws. All persons desiring to hunt or fish must obtain licenses. A general license for residents costs \$2.00. Non-residents license, general \$30.00; limited license entitling holder to hunt and kill game birds and small game and to fish with hook and line, \$10.00. All citizens of the United States who have not lived in Montana six months must secure a non-resident license before hunting or fishing. Alien license, general, \$50.00; fishing license, \$10.00; non-resident fishing license (fishing only), \$3.50. Children under the age of 15 years do not require a license, nor does any person hunting, killing or trapping predatory animals, prairie dogs, ground squirrels, skunks, weasels, jack rabbits, pocket gophers, hawks, crows or magpies. All licenses expire April 30 next succeeding their issuance.

It is illegal to hunt or kill any game animals or game birds from any automobile, nor shall game birds or game animals be killed or hunted from any aeroplane, power-boat, sail-boat or any floating device towed by a power-boat or sail-boat.

Forty fish with a net weight of 20 pounds and one extra fish is the limit for a day's fishing, and it is illegal to have more than 40 fish or more than 20 pounds net weight of fish in one's possession at one time. Game fish can be taken only by hook and line. Hunting and fishing licenses may be procured from dealers in most cities in the State.

Open Season on Game.

Open season for elk from October 15 to November 15. (Exceptions, see game laws.) Limit, one elk. Felony to remove the head or teeth of an elk and

leave the edible portion in the field. Closed season on elk in 45 Counties of Montana and portions of Lewis and Clark, Powell, Missoula, and Gallatin Counties.

Open season for deer from October 15 to November 15. Limit, one male deer. Closed season on deer in Yellowstone, Rosebud, Custer, Powder River, Carter, Richland, Roosevelt, McCone, Dawson, Treasure, Prairie, Teton, Phillips, Garfield, Valley, Carbon, Musselshell, and certain portions of Fergus, Glacier, Pondera, and Gallatin Counties. (See game laws for particulars.)

Open season for grouse, prairie chicken, sage grouse, fool hen, pheasant, partidge, September 15 to September 24, both dates inclusive. Limit, five birds a day, or in one's possession at any one time. Open season in all counties except Toole and Jefferson.

Open season for geese, ducks, and brant, September 16 to December 16. Limit, 20 ducks a day, and eight geese or brant.

Open season for fur-bearing animals—muskrat, otter, fox, mink, raccoon and fisher—November 1 to May 1, following.

Permanent closed season on mountain sheep and mountain goats, buffalo, moose, caribou, antelope, quail, Chinese pheasant, Hungarian pheasant or partridge, wood duck, curlew, swan, loon and turtle-dove.

Penalties for Violation.

Violation of any term of the game law defined as a misdemeanor is punishable by a fine of \$25 to \$500, or imprisonment for not less than ten days nor more than 180 days, or both such fine and imprisonment.



Fallen Monarchs of the Forest.

TRANSCONTINENTAL HIGHWAYS



Many Side Trips to Little Known Beauty Spots—Three Main Highways Through State.



Three main east and west transcontinental highways enter the state. They are the Roosevelt highway, entering at Bainville and following the main line of the Great Northern across the northern part of the State via the east entrance to Glacier Park. Cars are then shipped to Belton, and the motorist continues westward, leaving the State at Troy, and on to Spokane and the coast.

The National Park Highway enters the State at Yates. The Yellowstone Trail comes in by way of Baker. The National Park and Yellowstone Trail join at Fallon and continue to Livingston, where one fork goes to Gardiner and the other continues westward to Three Forks, where it forks again, the south fork by way of Whitehall and to Garrison, and the north fork by way of Townsend or Boulder, to Garrison and Missoula. The south fork passes



out of the State near St. Regis and to Wallace, the north fork near Thompson Falls and to Sand Point. The Custer Battlefield Highway enters the State at Wyola and intersects the Yellowstone and National Parks Highway at Billings, there turning north to Great Falls and Glacier Park.

Highways Between National Parks.

There are three main routes between the Parks, the Yellowstone-Glacier (Y-G Bee Line), the Central Route, and the Westerly Way. One of the scenic approaches to Yellowstone Park is the Bozeman-Gallatin Way.

Side Trips.

There are many good side trips, the attractions being fishing, boating, mountain climbing and viewing matchless mountain scenery. The tourist will be directed to these beauty spots by inquiring of commercial clubs or other public information places along the route. A new route is the Skalkaho, which opens to the motorist an interesting part of western Montana, between Anaconda and Philipsburg.



Three Hours' Catch.

THE WONDERLAND OF TODAY (Yellowstone National Park)

By Barbara Ann Scharr.

As did Alice in the Long-Ago-of-Fairyland experience the conflicting emotions of wonder, fear, and unbelievable joy upon coming face to face with mystic phenomena and surprises in Wonderland so did John Colter, early frontiersman, in 1807 experience consternation and marvel when he chanced upon the primitive, colorful panorama of a country which later became Yellowstone National Park. When he reported the discovery of this western wonderland to civilization he was doubted. Likewise when Jim Bridger, guide, and J. L. Meek, trapper, chanced upon this same revelation in 1829 and told of its marvel and beauty they, too, were discredited—laughed at; when W. A. Terris, pioneer fur agent, in 1834 and Captain DeLacy, gold seeker, in 1863 found and attempted to reveal to the world its existence they were doubted; and it was not until many years later after official exploration parties had delved into the heart of the colorful mountain recess that Yellowstone was recognized as existent and made a National Park.

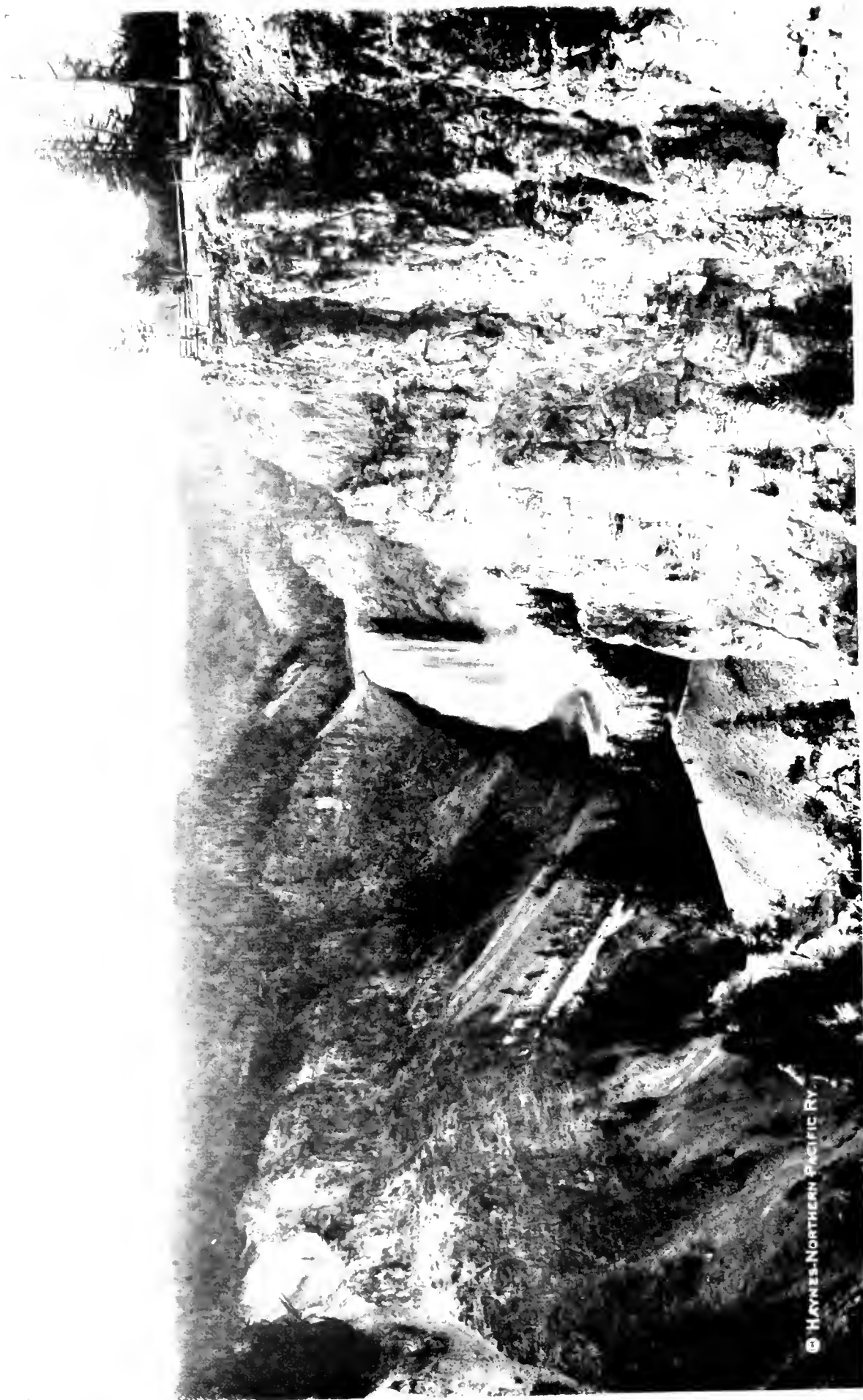
More than one hundred years have passed since Colter viewed Yellowstone Park, first of all, and wondered at it; and none, save the Mind of the Infinite Creator, has knowledge of how long before that time it had been in existence—three thousand three hundred and forty-eight square miles of tinted, seething muds; spectacular, spasmodic geysers; shimmering, delicately shaded lakes; steaming, turbulent pools; leaping, mist-hung waterfalls; brilliant sands and terraces; and gala flowers, hedged in by infinitely builded mountains, deeply gorged plateaus and velvet-like woodlands wherein beasts and birds of remaining primitive ways find seclusion even today.

Man wonders if God, perhaps, did not here set his forces to work far in the distant past so that when civilization did finally chance upon it it would have grown to increased, intrinsic beauty; and, apparently, it is still shaping itself for with each ensuing year it takes on added charm and individuality, several new and variant formations having burst into prominence during the past spring, as a consequence of which "Black Growler," a treacherous gulf of tossing, roaring mud and steam, now has a twin brother, "Red Growler," and can no longer claim exclusive attraction on that point. Likewise, other of Yellowstone's prodigies will be forced in the future to exert greater effort in exhibition if they are to maintain their first glorious reputations.

It would seem as one stands in the midst of the incensed, unceasing turmoil of this vast, tumultuous region that each phenomenon were striving to outdo the other and one wonders—is there no end?—will they not some day suddenly cease, exhausted, spent? But countless ages will come and go while the mighty works of Yellowstone still prevail.

The Grand Canyon.

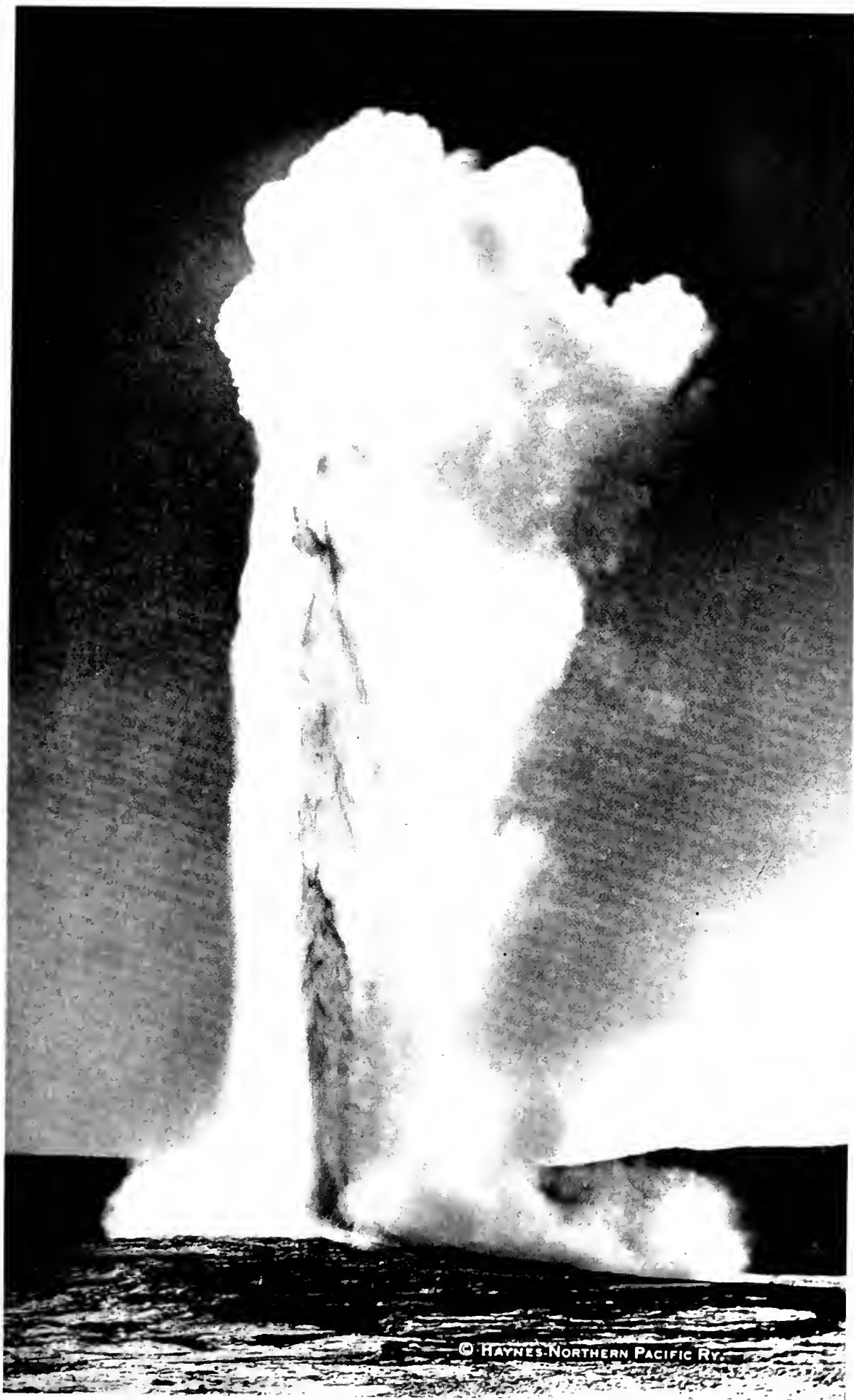
While the fame of Yellowstone Park suggests to the world "geysers and phenomena" still there are other features equally as enrapturing, for instance, the Grand Canyon. Inspiration Point in this beautiful canyon was, indeed, rightfully named for from here the eye looks down twelve hundred feet onto the narrow, although only seemingly so, green, winding way of the Yellowstone River, banked on either side by massive, rising walls of kaleidoscopic beauty which have never been surpassed in natural revelation by any spot on the globe. Walls—castellated,



© HAYNES-NORTHERN PACIFIC RY.

Courtesy Northern Pacific.

GRAND CANYON OF THE YELLOWSTONE, YELLOWSTONE NATIONAL PARK.



Courtesy Northern Pacific.

OLD FAITHFUL GEYSER, YELLOWSTONE NATIONAL PARK.

slashed, etched, fissured, niched and torn by time, and as beautifully colored as they are broken, reflect beyond the power of human description or artist's brush hues, vivid and resplendent, which here give radiance to the very sky instead of the blue of heaven being lent to them. Shadows of the cloudland o'erhead and of scattered, weathered trees hung on the harrowing walls of the mighty canyon play in and out among the prismatic fleeting and returning colors and reflections—ochre, sapphire, ruby, gray, green, gold, violet, orange, mingled with bright and delicate shades, unnamed. And, at the head of the canyon, as though its supreme beauty alone were not enough to completely dazzle man, there breaks into sudden play the Big Falls of the Yellowstone, dropping with sheer violence to depths three hundred feet below—a massive, tumbling flood of feather-sprayed, roaring, sunlit waters. (See full page photograph.) Heaven, surely, was close at hand in the Grand Canyon of the Yellowstone!

The Geysers.

Assembled within the area of Yellowstone Park one hundred geysers, more than in all the rest of the world combined, come into play—some fitfully, some regularly—but all with that unspeakably awful force and beauty which halts the human heart to know that he, even the most egotistical, is less than one flake of dust in the eternal workings of the universe.

Old Faithful—faithful yesterday, today and tomorrow—breaks forth regularly about every seventy minutes in a wide, pillar-like volume, topped by colored, rolling clouds of steam and draped to earthward by falling, rainbow sprays—the most renowned and splendid geyser in existence. At night for the entertainment of guests a huge searchlight plays from the roof of the Inn upon the spectral, hissing eruption of Old Faithful Geyser, perfecting a sight never to be witnessed elsewhere. (See full page photograph, this section.)

Other geysers in Yellowstone, the Beehive, Daisy, Giantess, Grand, Castle, Grotto—one hundred or more of them, all spurting, fuming, playing in the unending schedule of Nature's program seize the bystander with as many rapidly changing emotions as are they variant in form and color, and are but one of Yellowstone's fascinations.

Transportation.

Automobile travel will take one to the main points of interest—the roads in Yellowstone are of the best—and for those who wish to hike and take more time in viewing the more secluded places, such as wild game haunts; fishing streams; remote peaks and glaciers; and peculiar earth and rock formations hidden in isolated parts, there are well beaten woodland trails which they may traverse from dawn till dusk to their heart's content.

John Colter, pioneer, the first white man to look upon the original charm of Yellowstone Park and to marvel at its incomprehensible existence by no means has been the last. Each year thousands of vacationists enter its dominion and after a sojourn of rapturous days in a realm of wonders—miraculous and compellingly beautiful—reluctantly close the gates of The Wonderland of Today behind them—happier and more enlightened for having spent a short season amid surroundings which do not liken unto the everyday.

GLACIER NATIONAL PARK.

By Barbara Ann Scharr.

Like the great state wherein it lies, Glacier Park is, indeed, a treasure land, but possessed of treasures greater than those tangible or of monetary value. Rather, are they the priceless, inexplicable treasures found only where the Great West begins.

Here in a wilderness of massive, snow-clad mountains on whose rugged slopes recline the vast, deep stretches of ice and snow, which have given the park its name—seemingly boundless glaciers—here where lakes lie in cool, glassy quietude reflecting with the clarity of mirrors the blue of skies, the green of woodlands and the height of mountains, here where days dawn in gold and drift on through long, happy hours, free from cares, to sink in rose and purple sunsets; here where people from all walks of the universe meet either in the spacious, rustic hotels and chalets or out on the far, high places of hidden mountain trails; here may be found the greatest treasures of life—freedom, wholesome atmospheres, even thinking, and a beauty of such magnitude that it lingers ever in the memories of those who witness it.

Lakes and mountains, skies of blue,
Birds that sing all day to you,
Hills to climb, vales to descend,
Breezes that enchantment lend,
Trails that lead you know not where—
And somehow you do not care—
Swishing woodland, mountain streams,
Hours to fill with naught but dreams,
Space that opens new desires,
Kindling dead ambition's fires;

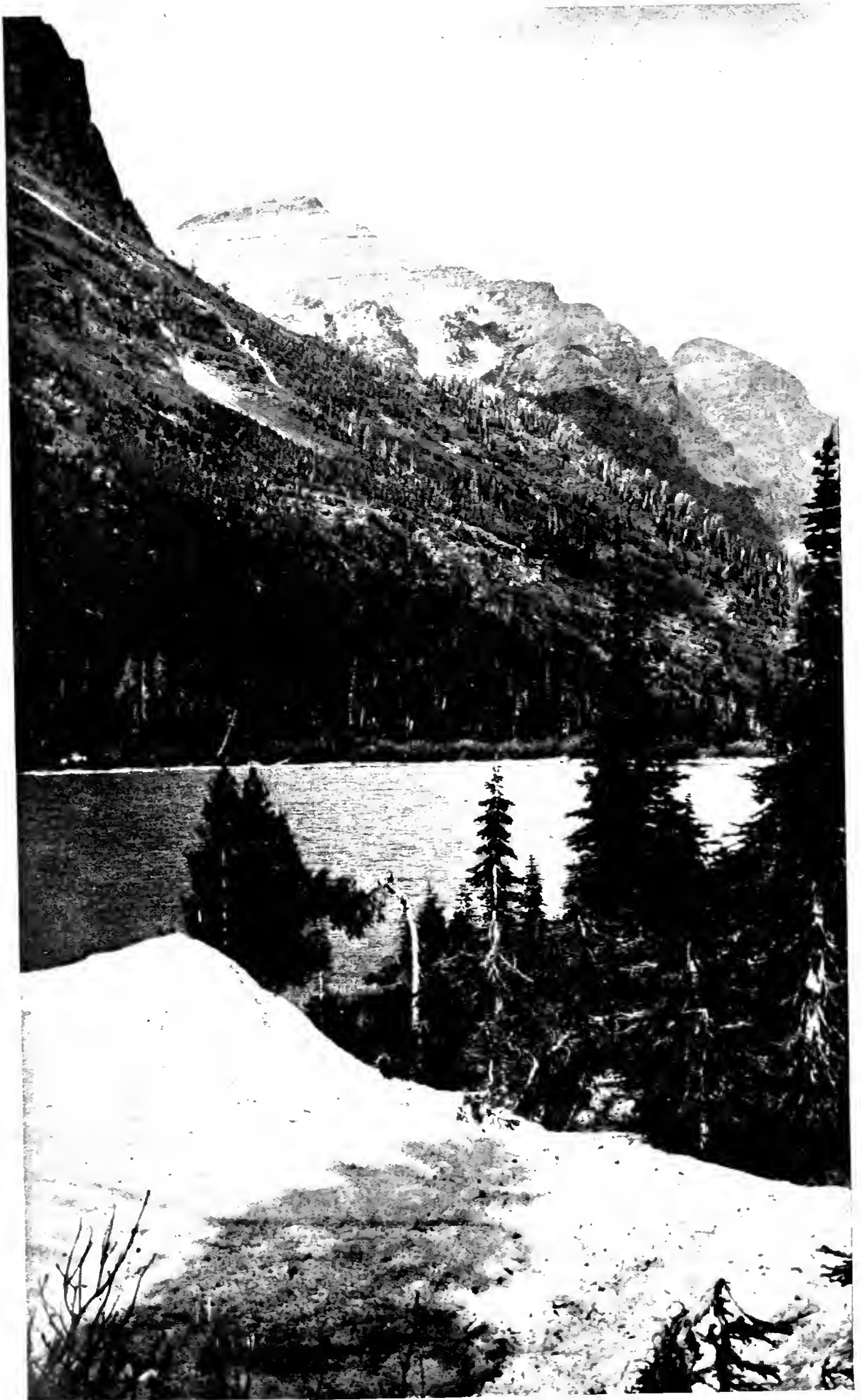
Oh, what wonderland awaits
Him who knocks at Glacier's gates!

Lakes, Waterfalls and Streams.

In June, particularly, are the waters of Glacier Park beautiful and swelled to overflowing. There are streams clear as crystal, reflecting rainbow colors in the sunlight, and other streams tinted with the blue of the skies. Some sprays fall green as the hue of emeralds and others seethe in bubbling, milky-white glacial masses.

At unexpected turns in the trail gigantic waterfalls burst into view, pounding downward with such noise and fury as to deaden every sound in the woodland. Others plunge through deep, narrow gorges far below the trail. Tumbling in cataract after cataract, the spray of which rises far above the top of the gorge, the waters dive fitfully downward with a violence which resounds throughout the vibrant walls of the chasm in a frightful deafening roar. There is no moment of greater sensation than that spent clinging to the edge of a precipice as you look down on thundering boiling waters, feeling each moment that the very rocks to which you cling will be undermined by the riotous stream below.

Likewise, the transparent blue lakes, lying both in the depth of valleys and in the broad, weathered pockets of mountain tops, are marvelous sights; and, as



Course - Great Northern.

LOWER END OF TWO MEDICINE LAKE, GLACIER NATIONAL PARK.



Courtesy Great Northern

SUN CHALETS, LAKE ST. MARY, GLACIER NATIONAL PARK.

man looks upon them he wonders if anywhere else in the world there could be lakes as beautiful in perfectly colored and mirrored reflections of the universe.

The Mountains.

Had the spires, domes, vaults and reverend hallways from the world's oldest cathedrals been transported to Glacier it would cause no more wonder than the mountain formations found there, which are attributed to glacial action. All of Glacier's mountains are rugged—and they are gigantic, but no two in the fifteen hundred square miles of the park resemble one another in any "way, shape or form."

Some of them lie moulded, peak after peak, in solid ridges. Others stand out, each mountain entirely separate from the other and of different formation. Some rise directly upward, triangular in shape; others point forward like sharp, mammoth wedges. Some rise to one single, rounding point; others to long, narrow weather-beaten ridges at the summit. Some rise perpendicularly in the foreground and slope gently downward on the opposite side; and others in reverse proportions. Some are made up of towering palisades standing side by side; others of horizontal or slanting drifts of varying colors of rock, one upon another. The surface of many of the mountains is so weathered and crevassed that it resembles the furrowed skin of old Indian chiefs, while other surfaces are of smooth, impenetrable elements.

The Wild Flowers

Those who come to Glacier with a half-hearted interest in flowers go away, many of them, with some little corner of their luggage chock full of specimens which they are "taking home to press." It is inevitable. The most indifferent will cultivate an interest in the flowers of Glacier.

The flowers are neither trained nor touched by the hand of man, but better so for they grow unhampered in beautiful array on every hillside and open space. There are dainty, lovely wild flowers every step of the way in this glacial wonderland.

A careful study of the blossoms has shown that there are several hundreds of varieties. The Indian Paint Brush, Glacier's emblem, is perhaps more strikingly beautiful than any of the rest. In places it grows ten or twelve inches high and usually in heavy, widespread clusters. The plant, the blossoms of which are rather long, flat and narrow, is a slender, slightly leafed stalk, and quite realistically resembles a paintbrush. A full bed of them, sighted against the velvet green of the trail ahead, the colors ranging from a bright orange to a flashing scarlet, is a spectacle which will warm the most indifferent soul.

There are false and true forget-me-nots; Glacier lilies; white, yellow and purple violets; wild geraniums, Mariposa lilies; blue bells; yellow bells; daisies; wild roses; columbine; anemones; far reaching fields of wild, purple larkspur—all of the flowers you know and hundreds you don't know and will, perhaps, never see elsewhere. Their bright, gay hues, variant forms and ever prominent, though modestly beautiful faces, pry their way into the very soul of man.

The Sunsets.

So brilliant are many of the sunsets in Glacier that were the flaming yellows, golds and scarlets of the hundreds of beds of Indian Paintbrushes, found scattered over the hillsides, lifted skyward by an Unseen Hand there to burn on the long,

slender clouds, hovering just above the horizon, and melt into the more delicate blues, greens and orchids of the evening sky, they could not be more spectacular.

One evening the western sky will present a terrace of long, narrow golden clouds, running parallel with the line of the darkening horizon, one above the other, from the upper and lower edges of which spread downy friezes of golds and yellows against the contrasting azure blue. As the sun drops lower and a thicker darkness spreads over the earth the terraced, golden clouds slowly turn to a blazing roseate hue, seeming to flame triumphantly as they make their last stand against the inevitable, oncoming black of the night.

Another evening may bring a western sky piled high with seething, cumulus clouds, their ominous black outlines sketched in gold by the sun sinking rapidly behind them. The sun may succeed in peeping through for a moment and if it does the angry, storm-filled clouds will be covered by such a dazzling brilliance as to almost obliterate them to the eye, leaving visible only their remotest, dark rolling edges. But most of the storm-clouds in Glacier are only "make believe" for their fury is appeased by icy atmospheres which rise from snow-capped mountain peaks at dusk; and a stormy sunset, after it has completed its mission of beauty, usually brings a peaceful, starlit night.

On cooler days the sunsets are less dazzling, but they are always intricately colored, which is attributed to atmospheric conditions found only in high mountain altitudes. At such times the hues which encircle the upper hemisphere, lying one above the other, row upon row, graduate and blend from brighter shades at the horizon to more passive ones at the zenith, transforming the entire sky into a veritable canopy of delicate rainbow colors.

When God had finished the mountains, and they stood like huge, silent monsters, devoid of charm, other than that of their overpowering strength, He saw they were barren and lonely, and that the playground which He had builded for the Children of Earthland would fill them with fear and depression instead of joy, unless their rigid heights were softened and their desolate slopes made beautiful.

Then came the deep, whispering forests; the flowered verdure of the hillside; the laughing fall of waters; the thundering chant of unseen torrents; the placid beauty of pictured lakes; the whistle and call of birds and beasts—and their echoes; and the frozen fields of snow and ice at the mountain tops whose prismatic reflections on the wakening, eastern skies at morning brought rapturous days, and on purple western skies at sundown brought peaceful, moonlit nights.

As it was moulded in the long ago, so does Glacier Park stand today—primitive, untouched and ever-calling in the masterful beauty of a teeming wilderness.

Sunsets like these remind man that he must likewise pay daily heed, while yet he may, to the beautiful friendships about him, for, like the sunsets, even the closest will some day vanish from his sight.

HAVE FAITH IN MONTANA

Montana's death rate is the lowest in America, 7.0 per 1,000.

Montana's wealth has increased 98.2 per cent since 1912, according to the U. S. Census Bureau.

Every county in Montana has mineral resources, according to the U. S. Geological Survey.

Montana produces more manganese than any other state.

Montana coal fields are the third largest in the United States, covering 39,532 square miles—an area about the size of Ohio or Virginia.

Montana streams develop at present 360,000 horse power, according to the U. S. Geological Survey, with a potential development of 2,550,000 horse power, which the survey states is 7.32% of all the water power in the United States.



Courtesy Great Northern.

KINTLA LAKE, KINNERLY PEAK, GLACIER NATIONAL PARK.

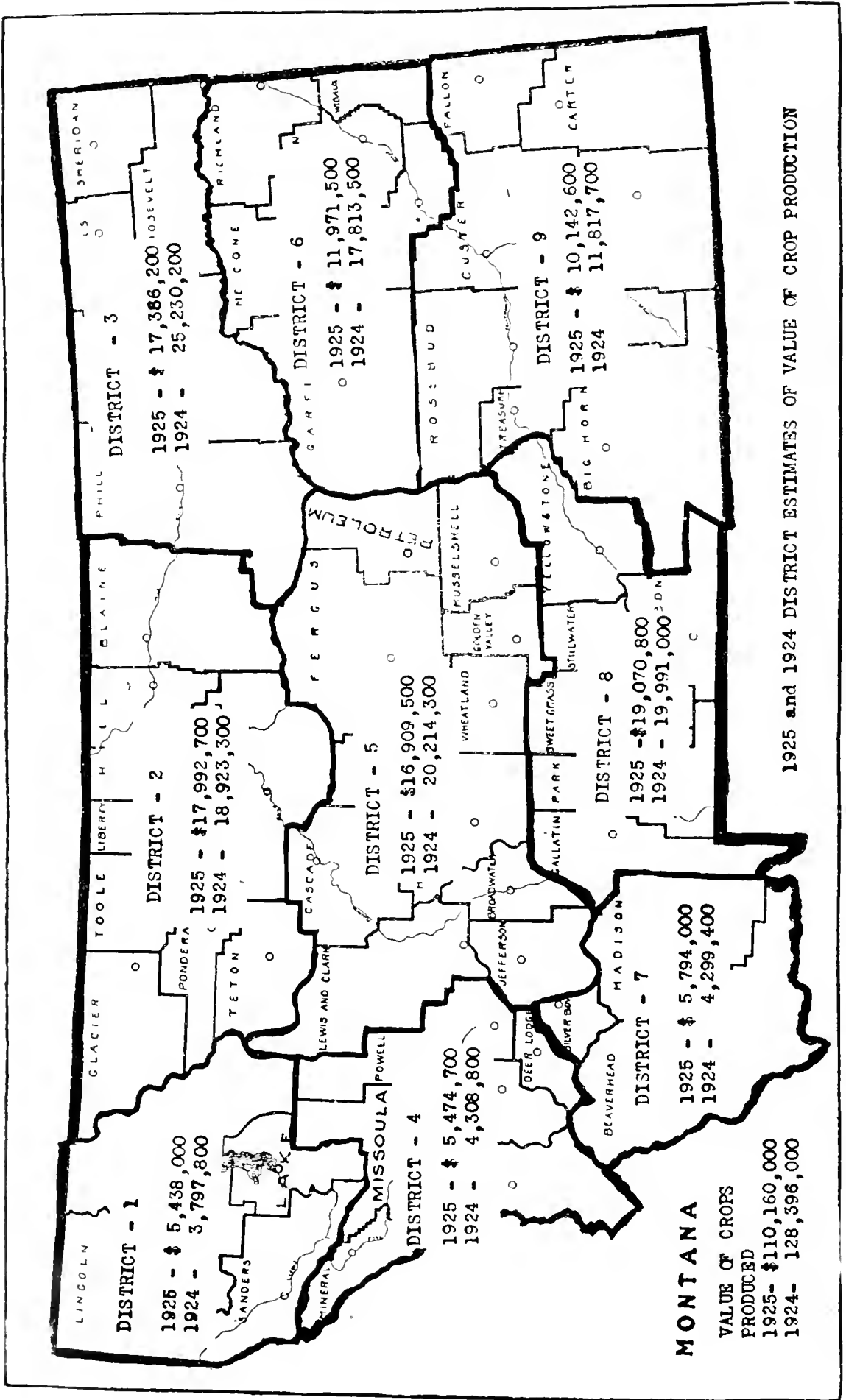
The Counties of Montana

When the Territory of Montana was established in 1864, the whole vast area was divided into the nine counties of Beaverhead, Big Horn, Chouteau, Deer Lodge, Edgerton, Gallatin, Jefferson, Madison and Missoula.

The increase of population and the extension of settlement has made necessary the creation of additional counties until today they number 56.

In the County arrangement used in this book, grouping is made to include counties with similar farming conditions in the same group, the State being divided into five such groups. The map on the following page will readily permit locating counties as to the group, or section of the State under which that county is discussed. To further simplify finding particular counties, the following alphabetical listing shows the name of the County and page where data on that County may be found:

County	Page	County	Page
B		M	
Beeaverhead	235	Madison	234
Big Horn	223	McCone	240
Blaine	266	Meagher	251
Broadwater	244	Mineral	257
C		Missoula	254
Carbon	229	Musselshell	250
Carter	224	P	
Cascade	245	Park	230
Chouteau	269	Petroleum	241
Custer	225	Phillips	265
D		Pondera	270
Daniels	261	Powder River	226
Dawson	238	Powell	255
Deer Lodge	256	Prairie	242
F		R	
Fallon	222	Ravalli	258
Fergus	246	Richland	239
Flathead	275	Roosevelt	264
G		Rosebud	227
Gallatin	228	S	
Garfield	243	Sanders	277
Glacier	268	Sheridan	262
Golden Valley	253	Silver Bow	236
Granite	260	Stillwater	232
H		Sweet Grass	233
Hill	267	T	
J		Teton	271
Jefferson	248	Toole	272
Judith Basin	252	Treasure	221
L		V	
Lake	276	Valley	263
Lewis and Clark	247	W	
Liberty	273	Wheatland	249
Lincoln	274	Wibaux	241
		Y	
		Yellowstone	231



SOUTH EASTERN MONTANA



Stockraising and Non-Irrigated Farming the Chief Industries—One of the Leading Corn Districts, Large Coal Fields—Rail Facilities Hinder Development of the Southern Part.



In the days of the trail herds one of the most noted stock districts of the northwest, stockraising still continues to be the leading industry of South Eastern Montana, which embraces Carter, Fallon, Custer, Powder River, Rosebud, Treasure and Big Horn counties. Except in the Yellowstone and Big Horn valleys, non-irrigated farming is the dominant method of agriculture. The one-crop system has prevailed but in recent years corn, to which the region is well adapted, has been introduced, and the acreage devoted to it is rapidly expanding.

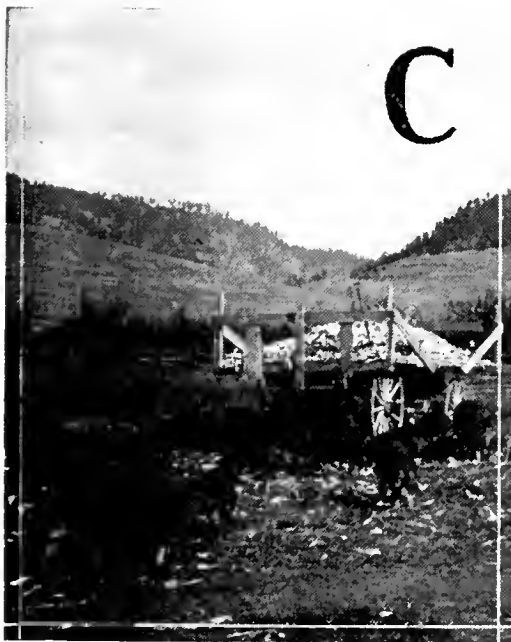
The largest coal measures in the state underlay this district, and it is the leading producer of natural gas. Oil in commercial quantities has been found in the western part where there is also considerable undeveloped hydroelectric power and big deposits of gypsum.

The growing season ranges from 120 to 145 days and the elevation from 2,300 to 3,000 feet.

TREASURE COUNTY

Date of Creation.....	April 1, 1919	Estimated County Population, 1925.....	2,000
Land Area.....	879 square miles	Population, 1920.....	1,700
County Seat.....	Hysham	Population County Seat.....	260
Altitude County Seat.....	2,667 feet	Growing Season.....	May 1 to Sept. 15

By J. O. Crandall.



COMPRISES a tract 30 miles square in the richest part of the Yellowstone Valley. Good roads are maintained on the "pay as you go" plan. Yellowstone River runs through the center of the county from east to west and the valley contains about 20,000 irrigable acres. This with a number of large tributaries from the north and south furnish a large and rich agricultural and feeding district.

Surface and Soil: Irrigable and agricultural lands comprising 225,000 acres are level and gently rolling, mostly sandy loam with very little gumbo and heavy soil. Grazing land comprising 227,000 acres is mostly good grass land with very little gravel.

Crops: Produces excellent quality of sugar beets, corn, wheat, and alfalfa seed. Oats, alfalfa hay, beans, and smaller vegetables successfully grown in large quantities.

Drainage and Water Supply: Country is drained by adequate tributaries running into the Yellowstone River from the north and south. Good water is obtained from wells and springs.

Industries: Farming and raising of live stock are the principal industries. Large shipments of cream are made to adjacent creameries. Poultry and turkeys are also shipped to outside markets.

Mineral Resources: South of the Yellowstone River large coal deposits occur. They are being mined for local consumption. A large

deposit of bentonite is the only other known mineral in the county.

Timber: Heavy stands of cottonwood along rivers and creeks, and pines on the hillsides.

Land Values: Irrigable land is priced at \$50 to \$100 per acre, and agricultural lands at \$10 to \$25. Grazing land is worth \$3 to \$5 per acre.

Transportation and Highways: The main line of the Northern Pacific traverses the county from east to west. The Yellowstone Trail is the main highway with adequate connecting roads north and south.

Education: Number of schools, including high schools, 18; enrollment, 408. School districts are all in good financial condition.

Cities and Towns: Hysham, the county seat, is a town of about 300 population at the present time. Other towns are Sanders, Myers, and Big Horn.

Climatological: Seasons are comparatively mild as shown by the long growing season.

Annual Precipitation: About 14 inches, with 10 inches during the growing season.

Additional Information: For more detailed information about the resources of Treasure County write to J. O. Crandall, County Clerk, Hysham, Montana.

FALLON COUNTY

Date of Creation.....	December 9, 1913	Estimated Population, 1925.....	4,540
Land Area.....	1,685 sq. miles	Population, 1920.....	4,548
County Seat.....	Baker	Population County Seat, 1920.....	1,067
Altitude County Seat.....	2,929	Growing Season.....	107 Days

By C. C. Conser.

W



HILE Fallon County has passed through the usual stages of development of a new county, non-irrigated farming continues to be the chief industry. In the last fifteen years from the raising of cattle and sheep on the open range there has developed a high degree of diversification in farm production. There were shipped to market in 1925, 550 cars of wheat, 42 cars of flax, 11 cars of feed, 56 cars of horses, 112 cars of cattle, 26 cars of sheep, 16,000 hogs, 13 cars of eggs, one car of alfalfa seed, 190,000 pounds of butter, and 106,000 gallons of cream. The production of feed and forage crops, dairy products and hogs is increasing rapidly.

Surface and Soil. The surface of the county is rolling, somewhat broken in parts, with broad and fertile valleys and uplands. The soil varies from heavy clay loam to a sandy clay loam. It handles easily and retains moisture remarkably well when properly handled. An area of heavy black clay along the Cedar Creek Anticline is not adapted to general farming. Sixty-two percent of the county is tillable, the balance being adapted to grazing.

Crops: The chief crops are corn, wheat, flax, oats, barley, rye, alfalfa, sweet clover, potatoes, garden truck and small fruits. The county is in the corn belt of the state and fields of 50 to 100 acres are not uncommon. The wheat usually grades No. 1, dark Northern

and commands a premium. The acreage of corn and sweet clover is increasing rapidly.

Drainage and Water Supply: There are no rivers of importance in the county, but Fallon Creek and Pennel Creek, together with a number of smaller streams, flow through the county.

Industries: Agriculture and stock raising are the chief industries. A carbon black plant located at Baker utilizes the flow of natural gas for the manufacture of carbon black which is used in the making of printers' ink, automobile tires, etc. Sixty-one cars of carbon black were shipped in 1925. A creamery, also at Baker, has an annual production of about 175,000 pounds per year.

Minerals: The county is underlaid with a good grade of lignite coal. Natural gas is found in two fields in the Cedar Creek Anticline. The Baker field furnishes gas to heat the homes and business houses and in the manufacture of carbon black. The Cabin Creek field, with a gas pressure of 300 pounds per square inch, is also being developed and a carbon black plant is soon to be erected in the field.

Timber: The county has no timber of merchantable grade, although the creeks are lined with ash, cottonwood and wild fruit. Many farmers are developing excellent groves. In several sections considerable acres are covered with bull pine.

Land Values: Land can be purchased at prices ranging from \$8.00 to \$25.00 per acre, depending on tillable area, improvements and distance from railroads. Distance, however, is becoming a minor matter with the wider use of automobile trucks.

Transportation and Highways: The county is crossed by the main line of the Chicago, Milwaukee & St. Paul Railway. A branch of the Northern Pacific serves the northeastern part of the county. Carter County, which is without a railroad, utilizes Baker as its main shipping point. The Yellowstone Highway parallels the Milwaukee

railroad and is surfaced with native scorio, an excellent road material. The other highways are generally good, some of the principal ones also being hard surfaced.

Education: The county has three high schools, at Baker, Plevna and Ollie, with an enrollment of 130, four grade schools and forty-eight rural schools with an enrollment of 1,090. The Baker High school carries a full four-year course.

Cities and Towns: Baker is the market town for eastern Fallon and most of Carter County. Next in size are Plevna, Ollie and Westmore, market towns in excellent farming sections.

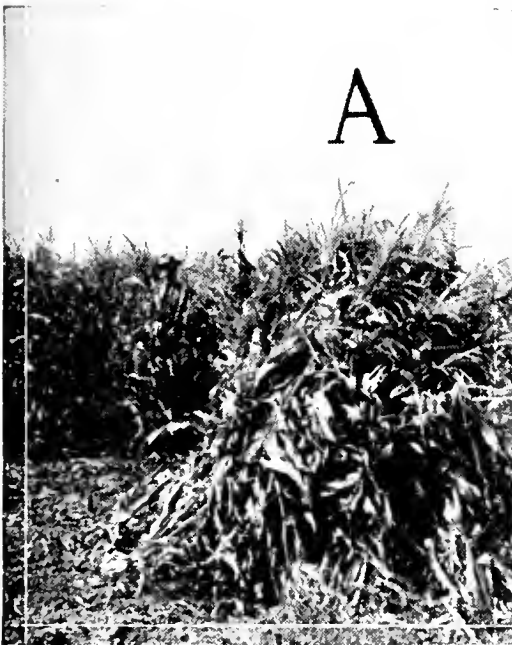
Climatological: The average annual precipitation, based on observations at Plevna for fourteen years, is 14.26 inches. Fifty-eight per cent of this falls in the months of April, May, June and July and is thus available for crop growth. The abundant summer sunshine accounts largely for the high nutrient quality of Fallon county hay, grass, forage crops and corn, as well as the high grade of Fallon county wheat.

Additional Information: For more detailed information about the resources of Fallon County, write to Secretary Commercial Club, Baker.

BIG HORN COUNTY

Date of Creation.....	January 13, 1913	Altitude County Seat.....	2,966
Land Area.....	5,111 square miles	Population, 1920.....	7,015
County Seat.....	Hardin	Population County Seat.....	2,000
Growing Season.....	110 to 132 days		

By Carl Rankin.



ADJOINING the northeastern boundary of Wyoming, Big Horn County is located in southeastern Montana. It lies between the Big Horn Mountain Range on the west and south, the Wolf Mountains on the east and the Pine Ridge on the north. The Big Horn, Little Big Horn and Rosebud River Valleys, with numerous tributaries to each, comprise one of the most fertile basins in Montana. Nourishing grasses, timber, coal, and other mineral products are found in abundance. All valleys are irrigated from canals with ample water supply; the benches and table lands are of the best non-irrigated lands found in the Northwest and stock raising advantages are unsurpassed.

Surface and Soil: The surface is broken by numerous rivers and streams, where are formed extensive benches and table lands, most suitable for growing winter wheat. The hill lands are well grassed and in many places well timbered. The soil which is of a sandy clay loam, is very fertile, productive, easily worked and is noted for its moisture-retaining qualities.

Crops: The principal crops under irrigation are alfalfa, clover, timothy, wheat, oats, barley, sugar beets, beans, potatoes, tomatoes, melons, and all classes of vegetables; also small fruits, such as strawberries, raspberries, blackberries, currants, etc. On the non-irrigated benches and table lands are grown abundantly winter wheat, spring wheat, flax, rye, barley, speltz, corn,

alfalfa and sweet clover seed, and most root crops.

Drainage and Water Supply: The Big Horn River traverses the county from south to north, and the Little Big Horn River from the southeast to the northwest, joining the Big Horn River near Hardin. Both rivers are fed by numerous tributaries draining the watershed of the Big Horn and Wolf Mountains, which furnish abundant pure, clear and cold mountain water for irrigation and stock purposes. The Tongue River flows through the southeastern part of the county.

Industries: Lumbering, coal mining, oil and gas industries are carried on extensively and Big Horn County is the largest honey producing county in the State of Montana, shipping many carloads annually.

Timber: Large areas of merchantable timber are available and numerous saw mills operate throughout the area.

Land Values: Improved irrigated farms range in price from \$30 to \$100 per acre. Improved non-irrigated farms range from \$10 to \$40 per acre, depending on location. Grazing lands range from \$4 to \$10 per acre. Inherited Indian lands on the Crow Reservation, which is included in this county, are sold from time to time at public auction at very reasonable prices and on terms.

Transportation and Highways: The main line of the Chicago, Burlington & Quincy Railroad traverses the county from southeast to northwest, serving Omaha, Kansas City, and Chicago markets east, and Pacific Coast markets west. A hard surfaced Federal highway extends from Hardin 60 miles southeast to the Wyoming line, in addition to 300 miles of graded county roads. All streams are bridged with substantial structures. Other Federal projects are contemplated.

Education: There are 38 schools, including four high schools, in the county, with an average attendance of 1,665 pupils. Most of the schools are in session nine and one-half months of the year. School taxes do not vary greatly and are not excessive.

Cities and Towns: The following towns located on the Burlington Railroad are Hardin, the county seat, Crow Agency, Lodge Grass, Wyola, Corinth, and St. Xavier.

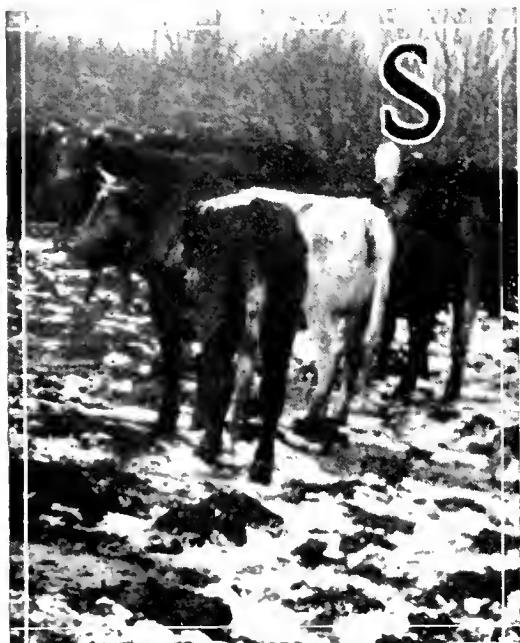
Climatological: Moderate winters prevail with clear, bright sunshiny days; ample snows insure abundant moisture. Summers have moderate day temperatures with cool nights. The annual rainfall is about 17 inches, well distributed over the growing season.

Additional Information: For more detailed information about the resources of Big Horn County write to Chamber of Commerce, Hardin, Montana.

CARTER COUNTY

Date of Creation	February 22, 1917	Altitude County Seat.....	3,000 feet (Est.)
Land Area.....	3,318 square miles	Population, 1920	3,972
County Seat.....	Ekalaka	Population County Seat, 1920.....	433
Growing Season.....	120 to 140 days		

By J. F. Lewis.



SITUATED in the extreme southeastern corner of Montana, Carter County is larger than some states and most of the land is fertile and productive. The county with its wealth of natural resources is destined to become one of the best in the State. Crops of all kinds do well, and farmers have learned that success depends upon diversification.

Surface and Soil: With the exception of the territory occupied by the National Forest, most of the surface of the county is a rolling prairie and the larger proportion of it is tillable. The soil varies from a sandy loam to a heavy gumbo. According to the last reports there were 849,771 acres of unreserved homestead lands in the county and 87,746 acres of state lands, that can be purchased on long-time payments.

Crops: The principal crops are wheat, corn and the other grains, hay and the various grasses, potatoes, and garden products.

Drainage and Water Supply: The Little Missouri River meanders through the eastern part of the county, the other principal streams being the Box Elder and Beaver Creeks. They are fed by numerous tributaries.

Industries: Farming, stock raising and dairying are the principal industries, the latter being fostered by an up-to-date creamery in Ekalaka. In the number of sheep, the county

stands fifth in the State. The cattle and hog industries are important, with the latter steadily gaining. The poultry business is also thriving.

Mineral Resources: Vast deposits of lignite coal underlay a large portion of the county. Building stone of the first quality is also found in inexhaustible quantities. The geologists have also mapped Carter County as one of the most promising of the undeveloped oil fields of the State. Prospecting is now under way in the southern part of the county and considerable development is looked for in different localities in the near future. No one doubts that the county will ultimately rank among the first in Montana as an oil producer.

Timber: Two divisions of the Custer National Forest, consisting of 1,141,541 acres, furnish fuel and lumber for the farmers and town residents, a number of saw mills being operated in the forest.

Land Values: Land ranges in prices from \$5 to \$25 an acre, values being low because of lack of transportation facilities.

Transportation and Highways: A railroad has been projected through the county from Belle Fourche, South Dakota, to Miles City, and it is believed that as soon as financial conditions permit it will be built. Trade from the southern end of the county goes to Belle Fourche, South Dakota, and from the northern end to Baker.

Education: Besides 60 rural schools in the county districts, there is a county high school at Ekalaka, the county seat, that is accredited for the four-year term. It is housed in a new \$14,000 modern building.

Cities and Towns: Ekalaka, the county seat of Carter County, is growing steadily. The town has a wide-awake business circle, two general stores, grocery store, hardware store, harness and shoe shop, drug store, two very prosperous banks (there never has been a bank failure), hotel, two cafes, two lumber yards, three garages, general repair shop, tailor, newspaper, picture theatre, three lawyers, two doctors, dentist, reliable real estate firms, bonded abstract company, creamery, photographer, and other lines of business. Pineale is a trading center. Other important towns are Capitol, Albion, Boyes, Belltower, Sykes, and Ridge.

Additional Information: For more detailed information about the resources of Carter County write to Ekalaka Chamber of Commerce, Ekalaka, Montana.

CUSTER COUNTY

Date of Creation	February 16, 1877	Altitude County Seat	2,371
Land Area	3,930 square miles	Population, 1920	12,194
County Seat	Miles City	Population County Seat, 1920	7,937
Growing Season	126-148 days		

By J. H. Bohling.

O

NE OF the original counties of the State, Custer lies in the southeastern part of Montana. Until recent years it was much larger in area but a number of counties have been cut off until it is reduced to its present size, being 60 miles in length north and south and 50 miles wide.

Surface and Soil: The topography of the county is somewhat irregular, being rolling, broken country with pronounced brakes along the Tongue and Yellowstone Rivers. The soil ranges from a sandy loam to a heavy clay and is generally underlaid with a clay subsoil.

Crops: Wheat, corn, oats, barley, rye, sweet clover, alfalfa, beans, alfalfa seed, and all root crops are successfully grown. Truck crops, corn, and alfalfa are grown under irrigation in the valley. The type of crops depends upon the location. An irrigation system extending from 11 miles south of Miles City on the Tongue River to 8 miles north on the Yellowstone comprises 10,000 acres.

Drainage and Water Supply: The Yellowstone River cuts the county in two, flowing northeast and having as feeders Powder and Tongue Rivers which drain the entire southern portion of the county. The water supply is sufficient in most sections of the county for both domestic and livestock use.

Industries: Stock raising and agriculture are the chief industries. The principal industry in Miles City, the county seat, centers around the shops of the Chicago, Milwaukee & St. Paul Railway. The Yale Oil Company also operates a refinery at this point.

Mineral Resources: Lignite coal deposits are found in nearly every area in the county and supply sufficient fuel for local consumption.

Timber: The timbered section is confined to the southern and eastern portions, which supplies lumber, posts and fuel for local purposes.



One of Montana's Natural Reservoirs for Irrigation

Transportation and Highways: Custer County has two transeontinental railroads which furnish excellent marketing facilities for local products. The Yellowstone Trail and National Parks Highways pass through the county, parallelling the railroads.

Land Values: The land varies in value from \$150 an acre for irrigable land to \$1.50 an acre for the poorer types of grazing land.

Education: There are 63 schools in the county, with a total enrollment of 2,530. This includes the high school located in Miles City.

Cities and Towns: Ismay is the only incorporated town in the county, outside of the county seat. Other towns are Kinsey, Beebe, Shirley, Ulmer, and Calabar. The U. S. Range Livestock Experiment Station of 57,000 acres is located near Miles City, at which place experiments in cattle, sheep, horses and hogs are now being conducted.

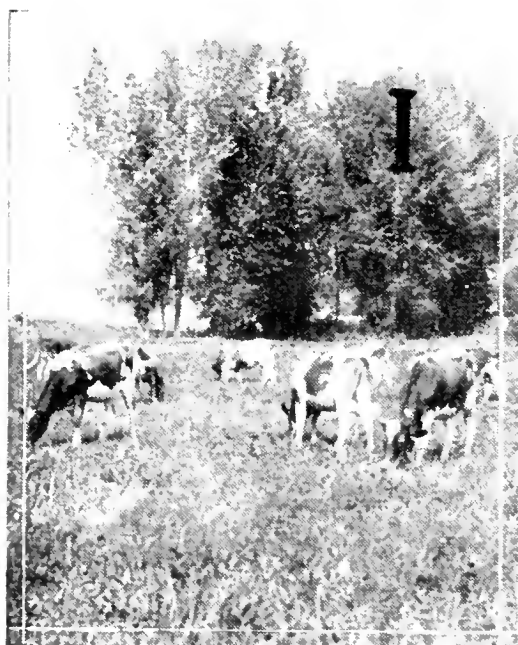
Climatological: Observations over a period of 34 years give the county an average of 152 days' growing season. The average annual precipitation is 13.96 inches, the greatest rainfall occurring in June. The mean average annual temperature is 45.5.

Additional Information: For more detailed information about the resources of Custer County write to Chamber of Commerce, Miles City, Montana.

POWDER RIVER COUNTY

Date of Creation	April, 1919	Estimated County Population, 1925.....	5,000
Land Area.....	About 50 miles square	Population, 1920.....	5,000
County Seat	Broadus	Population County Seat, 1920.....	150
Altitude County Seat	3,030 feet	Growing Season.....	April to September

By Jesse F. Dawe.



N. SOUTHEASTERN Montana, Powder River County comprises approximately 2,073,600 acres. The northern and eastern districts are largely composed of rolling prairie land with pine and cedar brakes. A low range of timbered mountains and the Custer National Forest occupy a considerable area of the western part of the county, and this district will always be best adapted to stock raising.

Surface and Soil: The western and southern portions of the county are rough, with broken surface, and is used largely for grazing. Sandy soil is found on the river bottoms, while the soil in those districts adapted to agriculture is chiefly a deep, fertile loam.

Crops: Spring wheat is the chief crop, but the acreage in corn for both feed and grain is rapidly expanding, the long, hot growing season making the crop particularly adapted to the district. Melons and vegetables do well, and on the river and creek bottoms alfalfa is successfully raised without irrigation. Oats, barley, rye, flax, sweet clover, millet and hay are also profitable crops.

Drainage and Water Supply: The Powder River runs northeasterly through the county. Into it flows the Little Powder River, which drains the southern portion of the county. Otter Creek, Pumpkin Creek, and Mizpah River are other streams which flow more or less during the year. Numbers of artesian wells, de-

veloping a good flow, have been brought in.

Industries: Stock raising is the chief industry of the county. During the past 20 years many homesteaders have come in. In the past few years there has been a pronounced movement to concentrate on crops of relatively small bulk and high value, thus partly overcoming the long haul to the railroad.

Mineral Resources: The coal resources are extensive, occupying the western three-fourths of the county.

Timber: Some commercial stands of timber. Cottonwood, wild plum, box elder, ash, pine and cedar.

Land Values: Land suited for agricultural purposes sells at from \$10 per acre and up. Grazing land is lower.

Transportation and Highways: A stage line operated between Broadus and Miles City, a distance of 90 miles. There are no railroads in Powder River County and no Federal Aid highways. There is a possibility of a railroad being built from Casper, Wyoming, down the Tongue River to Miles City, which will reduce by more than half the present distance to the railroad.

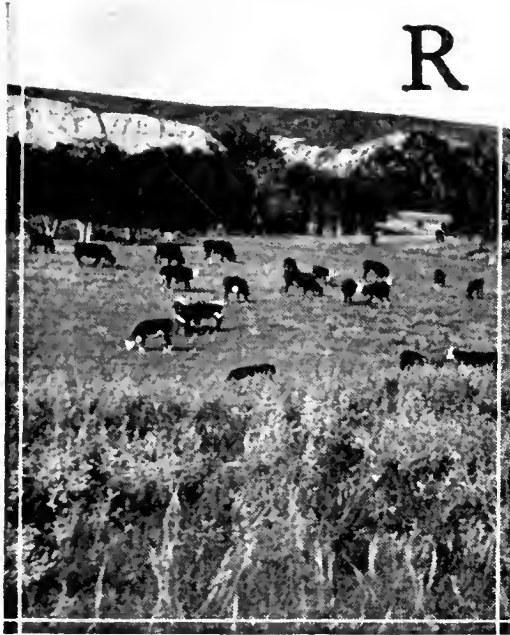
Education: Number of rural schools, 55; high schools, 1. Enrollment, 711.

Additional Information: For more detailed information about the resources of Powder River County write to Jesse F. Dawe, Circle, Montana.

ROSEBUD COUNTY

Date of Creation.....	February 11, 1901	Altitude County Seat	2,515 feet
Land Area.....	5,260 square miles	Estimated County Pop., 1925.....	Over 8,000
County Seat.....	Forsyth	Population County Seat, 1920	1,838
Growing Season	122 days		

By R. D. Mercer and E. J. Fleming.



R

OSEBUD County is located in the heart of the Montana corn belt and is devoted to both stock raising and agricultural purposes with much success. Sixty miles of the fertile Yellowstone Valley extends through the county from east to west. Parts of the Northern Cheyenne Indian Reservation and the Custer National Forest occupy practically the entire area of the extreme southern district.

Surface and Soil: The topography is rolling with valleys along the Yellowstone and Tongue Rivers, and mountains in the extreme southern portion. The soil is a chocolate loam in the lowlands and sandy loam on the benches.

Crops: Produces much corn, hay, alfalfa seed wheat, oats, barley; considerable flax, potatoes, beans, and rye. In irrigated sections sugar beets and truck crops are large and profitable.

Drainage and Water Supply: The county is drained principally by the Yellowstone and Tongue Rivers, the former flowing east through the center of the county and the latter northeast through the southern part of the county. Water is also obtained from wells and numerous springs.

Industries: The chief industries of the county are coal mining, farming, stock raising and dairying.

Mineral Resources: Immense deposits of a good grade of steam coal, covering an area practically 15 miles square, are found in Rosebud County. Some drilling for oil has been done in the county, but a proven field has not been established.

Timber: There is considerable pine in the southern part of the county. Other varieties of trees, including cottonwood, grow in the valleys and along the streams.

Land Values: Irrigated agricultural land would average about \$50 an acre; non-irrigated farm lands \$20 an acre. Land suitable for cultivation, not broken, is much cheaper.

Transportation and Highways: The main lines of the Northern Pacific and the Chicago, Milwaukee & St. Paul Railways traverse the county from east to west, through the Yellowstone Valley. Excellent graded roads, some of them graveled, are found throughout the county.

Education: There are 66 schools, including eight high schools, in the county, with a total enrollment of 1,615.

Cities and Towns: Forsyth, the county seat, is the principal trading point. Rosebud is the second largest and the center of a good agricultural district. Vananda, Ingomar, and Sumatra are shipping points on the Milwaukee.

Climatological: The climate is excellent. About two weeks of zero weather in a year is the maximum, the winters being unusually pleasant with lots of sunshine and the summers mild.

Additional Information: For more detailed information about the resources of Rosebud County write to the County Agent, or Secretary, Chamber of Commerce, Forsyth, Montana.

SOUTH CENTRAL MONTANA



*Combines Characteristics of Both the Eastern Slope and Plains Regions—
Includes Two of the Best Known Agricultural Districts—
Tourist Attractions and Minerals.*



The northeastern part of the South Central district, which is composed of Yellowstone, Carbon, Stillwater, Sweet Grass, Park and Gallatin counties, partakes of the characteristics of the plains region of Montana, while the western and southern parts partake of the characteristics of the eastern slope or mountain region. The best known agricultural districts are the Yellowstone and the Gallatin valleys where farming has been long followed and where diversification has been well established. Both irrigated and non-irrigated methods are followed. The district leads the state in alfalfa and sugar beets; it ranks second in coal production; is an important producer of livestock; and in the southwestern part contains varied mineral resources which include one of the largest deposits of chrome ore in the United States, and considerable undeveloped waterpower. It contains many tourist attractions. The northern, or Gardiner entrance to the Yellowstone park, is within its borders.

GALLATIN COUNTY

Date of Creation.....	February 2, 1865	Estimated County Population, 1925.....	17,000
Land Area.....	2,629 square miles	Population, 1920.....	15,864
County Seat.....	Bozeman	Population County Seat, 1920.....	6,183
Altitude County Seat.....	4,771 feet	Growing Season.....	78-105 days

By L. E. Hathaway.



VERY FEW agricultural districts in the country are so fortunately located as is the famous Gallatin Valley. Located on the headwaters of the Missouri River, in southern Montana, at the northwestern corner of Yellowstone National Park, Gallatin County has within its boundaries more than half a million acres of the best farming land in the State.

Surface and Soil: About one-third of the county in the southern portion is contained within the national forest. Most of the land is level; the bottom lands are rich, black alluvium, ranging in depth from two to 40 feet. The soil on the benches is a yellowish-gray colored loam of volcanic origin and it is still deeper and more inexhaustable than the soil of the bottoms.

Crops: Wheat continues as the leading crop, with oats and barley next, the annual production of these three being about 5,000,000 bushels per year. All grains are raised successfully and root crops and garden vegetables cannot be excelled. In 1925 a large acreage was planted to seed peas and peas for canning, a factory being located at Bozeman; beans are also rapidly becoming a stable crop.

Drainage and Water Supply: The valley lands are irrigated from the waters of the West Gallatin River and its tributaries. The Missouri River finds its source in Gallatin County, at the confluence of the Jefferson, Madison and Gallatin Rivers near Three Forks.

Water for domestic purposes in towns of the county is obtained from mountain streams and rivers. The water is exceptionally pure and cold.

Industries: Gallatin County has 17 grain elevators, three flour mills, one cereal food mill, Portland cement factory, four creameries, three cheese factories, daily newspaper, large pea cannery, which also cans string beans, and six seed pea houses. Among the other large and increasing industries are included cattle raising for slaughter, pure-bred cattle raising, as well as pure-bred hogs and sheep. The Montana State College of Agriculture, enrolling over 1,000 students, United States Government Experimental Station, and the United States Fish Hatchery. At Trident is located a large cement plant.

Minerals: Large deposits of coal in county. Also lead, copper, iron, cement and onyx.

Timber: The Gallatin and Bridger ranges of mountains are covered with timber. There are several small saw mills in the timbered region.

Land Values: Good irrigated land may be purchased for \$60 to \$240 an acre, while non-irrigated land sells for \$30 to \$60 an acre, the wide difference in price being due to location and improvements.

Transportation and Highways: Gallatin County has over 200 miles of railroad within its borders. Two of these, the Northern Pacific and the Chicago, Milwaukee & St. Paul Railways, are transcontinental lines. These two railroads have branch lines that traverse all parts of the county. The Yellowstone Trail traverses the entire length of Gallatin County, in addition to the National Park to Park Highway and the Glacier to Geysers Trail. The Gallatin Highway, nearing completion, is a wonderful scenic highway from Bozeman to West Yellowstone, the western entrance to Yellowstone National Park, through the Gallatin Canyon.

Education: There are 68 schools in Gallatin County, including five high schools. The total enrollment is 3,521.

Cities and Towns: Bozeman, the county seat, is the largest and most important town in the county. Other towns are Three Forks, Belgrade, Manhattan, Willow Creek, and Trident.

Climatological: Gallatin County claims 300 days of unbroken sunshine each year. During the summer months the nights are cool. The snowfall is never very heavy, although plentiful enough in the nearby mountains to furnish an abundance of water for irrigation. Rainfall records for Gallatin Valley, as shown by the United States Government Experiment Station, as kept for the past 26 years, averages 21.28 inches per year.

Additional Information: For more detailed information about the resources of Gallatin County write to Manager of Bozeman Chamber of Commerce, Bozeman, Three Forks, or Manhattan, Montana.

CARBON COUNTY

Date of Creation.....	March 4, 1895	Estimated County Population, 1925.....	17,500
Land Area.....	2,108 Square Miles	Population 1920	15,000
County Seat	Red Lodge	Population County Seat 1920	4,515
Altitude County Seat	5,500 feet	Growing Season.....	April 1 to Sept. 15

By O. H. P. Shelley.



IN VALUE of coal production, Carbon County leads the state. Situated in south central Montana, the Yellowstone River marking its northern boundary, Carbon County rises from an approximate elevation of 3,300 feet to more than 13,000 feet in the Beartooth mountains near the Wyoming boundary. Granite peak, the highest named mountain in the state, with an elevation of 12,850 feet, is in this county, and there are several unnamed peaks in the same range that are above 13,000 feet, according to the United States Geological Survey. The scenic resources of the county are being utilized to a greater extent each year and the Beartooth National Forest is rapidly becoming a playground for eastern Montana.

Surface and Soil: The southern part of the county is mountainous and is largely given over to stock raising. The valleys running north and south, widen out in the northern part of the county and the mountains give way to rolling bench lands. The soil in the valleys is a deep alluvial loam; on the bench lands a sandy loam, in the eastern portion a sandy loam and clay.

Crops: Sugar beet raising is extensively followed in the northeastern part of the county. Other crops are corn, alfalfa, timothy, wheat, oats, rye, barley, flax, vegetables of all kinds, watermelons, canteloupes, seed peas,

canning peas, small fruits, bees and honey, and various kinds of seeds.

Drainage and Water Supply: Carbon is one of the best watered counties in the state, numerous streams rising from the glaciers and snow packed drifts in the Bear-

tooth mountains. The principal streams are the Clark's Fork, Rock creek, Willow creek and Red Lodge creek. Water is found in wells at depths ranging from 10 to 30 feet.

Industries: Aside from agriculture and stock raising, coal mining is the chief industry. Bituminous coal is mined at Red Lodge, Washoe and Bear Creek, where the mines are reputed to be the largest in the northwest.

Mineral Resources: Immense deposits of coal are located at the three towns named above. The first producing oil well in Montana is located at Elk Basin, near the Wyoming line. Other mineral resources include gypsum, chromite, natural gas, limestone and sandstone, and possibly pottery clay, fire clay and uranium.

Timber: About one-fourth the area of the county is included within the national forests. Lumbering operations are conducted on a small scale. The high areas within the forests are utilized as summer grazing range for many bands of sheep.

Land Values: Prices for irrigated lands range from \$25 to \$250 an acre, according to location. Non-irrigated land brings from \$5 to \$20 an acre and grazing land from \$2 to \$8 an acre.

Transportation and Highways: The Northern Pacific, the Chicago, Burlington and Quincy, the Montana-Wyoming and Southern Railways provide rail transportation. The county is well supplied with trunk highways and gradual extensions are being made. At the present time there are about forty miles of gravel road.

Education: There are 67 schools in the county, including seven high schools, with a total enrollment of 3,846.

Cities and Towns: Red Lodge, the county seat, is the largest and most modern town. Other towns are Bear Creek, Belfry, Bridger, Fromberg, Edgar, Silesia, Joliet, Boyd, Roberts, Luther and Roscoe.

Additional Information: For more detailed information about the resources of Carbon County, write to Secretary, Commercial Club, Red Lodge, Montana.

PARK COUNTY

Land Area.....	2,679 square miles	Population County.....	11,500
County Seat.....	Livingston	Population County Seat.....	7,100
Altitude County Seat.....	4,490 feet	Growing Season.....	78-125 days

By D. P. Bates.

L

OCATED in the south central part of Montana, Park County is 104 miles north and south and 30 miles east and west. Its southern boundary is the northern boundary of Yellowstone National Park, access to the northern entrance being through this county. Two large fertile valleys are in the county, the Yellowstone Valley, which varies from 10 to 20 miles in width, and the Shields Valley, which varies from 15 to 18 miles in width. About 82,000 acres of the land contained in these two valleys is under irrigation.

Surface and Soil: The soil of the county is for the most part a rich black loam with a clay sub-soil. Approximately two-thirds of the area of the county is within the Absaroka, Gallatin and Beartooth National Forests.

Crops: The principal agricultural crops are hard winter and spring wheat, oats, rye, barley, peas, alfalfa, timothy, and clover. All of the grains and grasses produced in the county are of proven unexcelled quality.

Drainage and Water Supply: The Yellowstone and Shields Rivers together with their many tributaries form the county's source of water supply for irrigated lands. Cold water springs are found on almost all land sub-divisions and wells are seldom greater than 40 feet deep.

Industries: Agriculture, dairying, beef cattle, sheep, cheese-making, and mining are the chief industries. Livingston is a railroad division point and has large machine shops, as well as general division and accounting offices. The largest industrial activity is found in the railroad shops at Livingston, a granite works, a brick plant, and a lime kiln are located here. Located in the county are a flour mill, two granite cutting yards, a cigar factory, two creameries. The largest cheese factory in Montana operates near Wilsall. The products of a truck farm near Livingston are in demand on the fancy markets of St. Paul and Seattle. The Enterprise, a daily paper at Livingston, has the second largest payroll in the city.

Mineral Resources: Park County is one of the most highly mineralized regions in the state producing gold, silver, lead, coal, arsenic, tungsten and brick clay. It also has gypsum, gems, molybdenum and a variety of building and monumental stones. The Cooke City district, in the southeastern corner, is considered one of the most promising mining districts in the state, but its inaccessibility has retarded its development.

Transportation and Highways: Park County has excellent transportation facilities. The main line of the Northern Pacific goes east and west through the middle



of the county, and at Livingston, in the geographical center of the county, a branch runs north up the Shields Valley to Wilsall and another south up the Yellowstone to the Yellowstone Park. A main east and west highway crosses the county and the western Park to Park route from Gardiner to Glacier Station traverses the county north and south.

Education: Besides a modern high school and four large grade schools in Livingston, there is a high school at Wilsall, another at Clyde Park, and 65 common schools in the rural districts. There is also a Catholic parochial school at Livingston.

Land Values: Improved irrigated land sells for from \$75 to \$100 per acre; improved non-irrigated land at from \$25 to \$50, and grazing land at from \$5 to \$15.

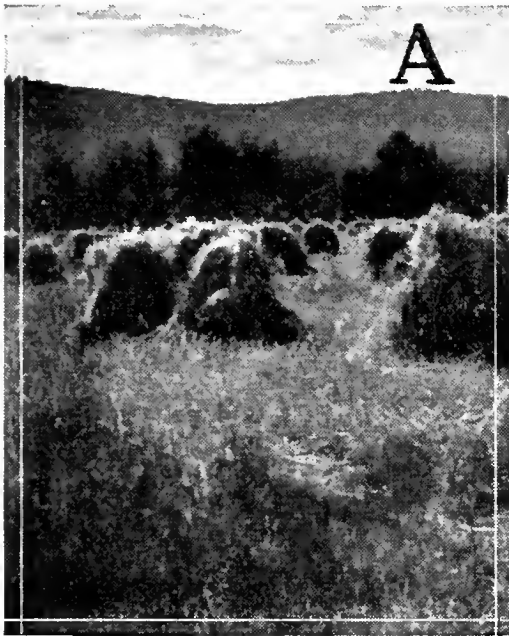
Cities and Towns: Livingston, the county seat, is a modern city and one of the more important cities in the State, and is generally recognized as the tourist center of the State; other towns are Wilsall, Clyde Park, Emigrant, and Gardiner.

For Additional Information write to Chamber of Commerce, Livingston, Montana.

YELLOWSTONE COUNTY

Date of Creation.....	February 26, 1883	Altitude County Seat.....	3,117 Feet
Land Area.....	2,708 Square Miles	Population, 1920	29,600
County Seat	Billings	Population County Seat, 1920.....	15,100
Growing Season.....	133 Days		

By J. A. Shoemaker.



AGRICULTURALLY, industrially and commercially the leading county in southeastern Montana, Yellowstone County also ranks third in population and Billings the county seat, is the third largest city in Montana. The county stretches southward fifty-five miles from the Bull Mountains and southwesterly seventy-four miles from the confluence of the Big Horn and Yellowstone Rivers. The latter traverses the county its entire length and the fertile valley lands bordering it are practically all under irrigation and cultivation, as is the major part of the so-called bench lands on either side. There are nearly 2,000 farms in operation in the county and in its agricultural industry it typifies diversified farming in perhaps the most advanced stage which has yet been reached in Montana. "Where good farming pays sure dividends" is a slogan applied to Yellowstone County which is conclusively backed up by the success of its farmers.

Surface and Soil: Yellowstone County ranks near the top in percentage of tillable land surface to total area, the broken and wasteland, what there is of it, being mostly usable. The valley lands along the Yellowstone River, of which 119,000 acres are under irrigation, comprise one of the most important and productive sections of the state. Here the soil varies from sandy loam to heavy clay loam.

The non-irrigated uplands, comprising by far the largest part of the county's tillable area, have a productive soil, with a sandy loam, highly retentive of moisture, predominating.

Crops: The principal crops are sugar beets, spring wheat, beans, corn, potatoes, and alfalfa. The outstanding developments of the last few years are the great increase in bean and corn production, hog raising, dairying, truck gardening and the growing of seeds of various kinds for the market. Celery, lettuce, tomatoes, cantaloupe, watermelons, etc., show heavy yields and superior quality, and both sweet potatoes and white burley tobacco have been grown experimentally with surprising success. The number of purebred herds of beef and dairy cattle, also hogs, is constantly increasing and the winter feeding of sheep, hogs and cattle is an important phase of the county's agriculture, the availability of beet pulp constituting a material factor therein. Turkey growing and bee culture are carried on with success and on an ever larger scale. Although ranking only second in area, this county has consistently ranked second in value of crop and livestock production, with an annual total of approximately \$6,000,000, and on a per acre production basis leads the state.

Drainage and Water Supply: The water supply for irrigation, derived from the Yellowstone River, is at all times ample and dependable and involves a very small per acre cost. For the most part drainage is well taken care of either by natural or artificial means, but in some sections of the county, the drainage problem remains to be given necessary attention.

Industries: Manufacturing is becoming of constantly greater importance in the county. The principal industry is beet sugar making, the Billings sugar factory being exceeded in size and capacity by no other in the world. Other important industries, most of which are located in Billings, are flour mills, a packing plant, creameries, a foundry, a pickle factory, a brick factory, coffee roasting plants, a broom factory, an artificial ice plant, woodworking establishment, bean and potato warehouses, seed houses, etc., as well as a large number of wholesale and jobbing houses, Billings being one of the largest distributing centers in the northwest.

Minerals: The principal minerals are coal, brick, clay and sandstone. The Bull Mountain coal field which extends into Yellowstone from Musselshell is according to the United States Geological Survey, one of the largest undeveloped fields in the state.

Land values: The price of agricultural land ranges from \$10 to \$40 an acre for non-irrigated plow land, and from \$25 to \$175 an acre for irrigated land. The irrigated land produces crops equal in value to the much higher priced lands of the middlewest.

Transportation and Highways: From the standpoint of both rail and motor transportation Billings, the county seat, is a hub. It is the junction point of three transcontinental railroads, the Northern Pacific, Great Northern and Burlington, as well as the terminal of several branch lines, and has 29 passenger trains in and out daily. It is also the junction point of several transcontinental highways including the Yellowstone Trail, National Parks Highway, Custer Battlefield Hiway, Glacier to Gulf Highway, Buffalo Highway, Beartooth Trail and Billings-Cody Way.

Education: Yellowstone County not only has highly developed grade and high school systems and one parochial school, but is the home of the Billings Polytechnic Institute and is also the location of a summer normal school with a large enrollment. There are a total of 191 schools in the county with an enrollment of 7,195.

Cities and Towns: Billings is an ultra-modern city both in physical sense and in its institutions, ideals and community life. It has 24 miles of paved streets and municipal water, sewer, street lighting and garbage disposal systems, electricity and natural gas, the latter being piped from the Elk Basin, Wyoming fields seventy-two miles south. Immediately adjoining Billings is the Midland Empire Fair grounds, one of the finest exposition plants in the country, where is held annually under the direction of and financed solely by the county, one of the largest fairs in Montana, at which attendance approximates 60,000 people. Laurel, fifteen miles west of Billings and the next town in size, is an important railroad center as well as the trading point of a large agricultural district. Other of the larger towns are Huntley, 16 miles east, the largest town in the Huntley Government Reclamation Project, and Broadview, 40 miles north, the principal shipping point for an extensive non-irrigated grain district.

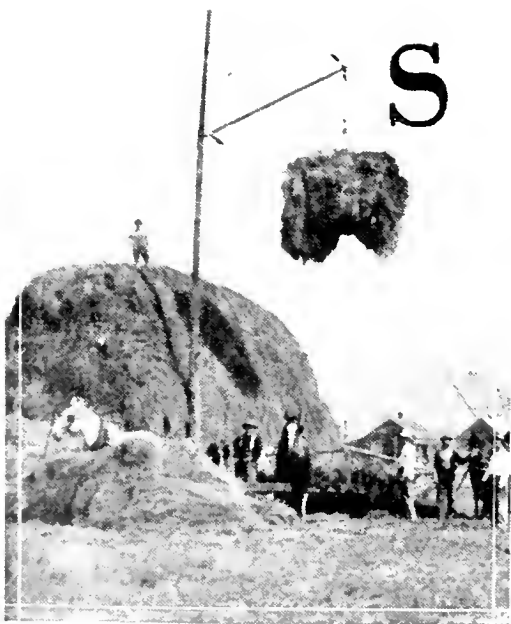
Climatological: Records covering a long period of years show that Yellowstone has the highest average annual mean temperature of any county in the state. The frost-free period averages 133 days, and the relatively high temperatures during this period are conducive to maximum crop growth. Precipitation, averaging approximately 14 inches a year, is sufficient for systematic non-irrigated farming, almost half falling opportunely during April, May and June. The winters are, with rare exceptions, mild, as may be inferred from the fact that during the last three years the number of 24-hour periods during which the mercury went below zero has averaged only ten per winter.

Additional Information: For more detailed information about the resources of Yellowstone County, write to the County Agent, or the Secretary, Commercial Club, Billings, Montana.

STILLWATER COUNTY

Date of Creation	March 24, 1913	Altitude County Seat.....	3,698 feet
Land Area.....	1,648 square miles	Population, 1920	7,630
County Seat	Columbus	Population County Seat, 1920.....	897
Growing Season.....	122 days		

By E. V. Wallace.



A large carbon black plant will be erected in the near future near Coombs.

Mineral Resources: While coal is the only mineral the county has produced in commercial quantities, there is what is considered the largest deposit of chromite in the United States extending through the southern part of the county.

STILLWATER is situated in the south central part of Montana. It is about 80 miles in length from the northeast to the southwest, and about 25 miles wide. The resources of Stillwater County are as diversified as its elevations, which range from 12,700 on Mount Wood, the second highest named peak in the State, to 4,000 feet in the non-irrigated areas of the northern part.

Surface and Soil: The Lake Basin country in the northern part of the county is considered one of the best non-irrigated farming districts in the State. The soil is deep and heavy. In the Yellowstone Valley the soil is a chocolate brown loam.

Crops: All small grains, corn, alfalfa, fruit, and truck garden crops. Sugar beets are also raised extensively. In the eastern end of the county, approximately 550,000 pounds of Great Northern beans were grown in 1925.

Drainage and Water Supply: The Yellowstone River crosses the county about midway, east and west. In the southern portion of the county are found the Stillwater and West Rosebud Rivers.

Industries: Agriculture and stock raising, coal mining, lumbering, drilling for gas and oil, both of which have been found in quantities. There is an abundance of water power which will eventually be developed for commercial uses.

Timber: There are 92,096 acres of the southern part of the county included in the Beartooth National Forest.

Land Values: Improved irrigated lands at \$35 to \$100 an acre; improved non-irrigated lands, \$20 to \$50 an acre, and unimproved non-irrigated farm lands from \$8 an acre up.

Transportation and Highways: The main line of the Northern Pacific follows the Yellowstone Valley through the county and a branch line of the same road taps the Lake Basin country. The Yellowstone Trail Highway traverses the county and good federal aid and county projects are nearing completion.

Education: There are 68 schools in the county, including six high schools, with a total enrollment of 1,699.

Cities and Towns: Columbus, the county seat, is the only incorporated town. Other towns are Park City and Reed Point, which are trading points on the main line, and Rapelje and Wheat Basin on the branch. Absarokee is the most important community in the southern part of the county.

Additional Information: For more detailed information about the resources of Stillwater County write to Secretary, Commercial Club, Park City; Secretary, Business Men's Club, Absarokee, or Secretary, Stillwater Club, Columbus, Montana.

SWEET GRASS COUNTY

Date of Creation.....	March 5, 1913	Altitude, County Seat.....	4,072 feet
Land Area.....	1,932 sq. miles	Population, 1920	4,926
County Seat.....	Big Timber	Population, County Seat, 1920.....	1,282
Growing Season.....	112-122 Days		

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AVING large areas of land naturally adapted to livestock raising, as well as important agricultural areas, Sweet Grass County furnishes opportunities to the settler interested in tilling the soil or in building up a cattle and sheep growing industry.

Surface and Soil: Extending through the county lay the Yellowstone Valley which is about 55 miles long and from two to five miles wide; also the valleys of the Boulder, Big Timber, Sweet Grass, American Fork and Otter Creeks. These valleys form the agricultural districts. The soil varies from a deep black loam to a light soil with a gravel subsoil.

Crops: Alfalfa is the principal crop, winter and spring wheat the leading cash crop, while oats is also raised extensively.

Drainage and Water Supply: The Yellowstone River flows from west to east nearly through the center of the county. On the north the land rises to the Crazy Mountains in which the Big Timber, Sweet Grass and Otter Creeks rise, while on the south the land rises from the level of the river to a high range of mountains in which the Boulder and Stillwater Rivers head.

Industries: Cattle and sheep growing, together with agriculture, form the important industries.

Mineral Resources: Chromite has been found in commercial quantities. Coal and Iceland spar have been found in much lesser quantities.

Timber: The chief timbered area is in the southern end, 200,273 acres of the county being included within the Beartooth National Forest. Less important areas are found in the Crazy Mountains in the northwestern part.

Land Values: Irrigated lands range in price from \$45 to \$115 an acre; non-irrigated farming lands from \$10 to \$25 an acre and grazing land from \$5 to \$10.

Transportation and Highways: The main line of the Northern Pacific parallels the Yellowstone through the county, as do all the main transcontinental highways.

Education There are 61 schools in the county, including a high school at Big Timber, the total enrollment being 1026.

Cities and Towns: Big Timber, the largest town and chief distributing point, is also the county seat. It is in the center of a rich region. Melville and McLeod are other important towns.



SOUTH WESTERN MONTANA



Holds Front Rank in Mining, Stockraising and Irrigated Acreage—Butte the Largest City in Montana and Most Important Distributing Point—Ranches Above the Average in Size.



Through Beaverhead and Madison counties, South Western Montana takes first place in stockraising, irrigated acreage and wild hay production, and through Silver Bow county it also leads in mining, and has the largest city and the most important distributing point in the state. Largely, perhaps, because of inadequate rail facilities, agricultural possibilities of Madison county have not received the recognition to which they seem to be entitled. Except for a part of Silver Bow county, the district lies in the slope region east of the main range of the Rocky Mountains.

While Silver Bow is the leading producer in the state, as well as one of the most important in the country, of copper, zinc, silver and arsenic, an unusually wide variety of minerals are found in Beaverhead and Madison counties, many of which are undeveloped. Considerable developed and undeveloped waterpower is in the district.

The agricultural areas range in elevation from 4,000 to 5,000 feet. The upper mountain valleys are devoted to hay for winter livestock forage.

MADISON COUNTY

Date of Creation.....	February 2, 1865	Estimated County Population, 1925.....	8,000
Land Area.....	3,588 square miles	Population, 1920	7,350
County Seat.....	Virginia City	Population County Seat, 1920.....	400
Altitude County Seat.....	5,760 feet	Growing Season.....	125-130 days

By George Gohn.

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UNROUNDED and divided by mountain ranges from 8,000 to 11,000 feet high, Madison County is composed of two parallel valleys, the Madison and the Ruby. The valley floors are from 4,000 to 6,000 feet elevation. Due to the large amount of grazing lands composed of forest reserves and open land, live stock production is the largest industry. The valleys are irrigated and produce unusually high yields of hay, grain, potatoes, and other vegetables. Dairying and poultry raising are successful.

Surface and Soil: The soils of the valleys range from a heavy clay to sandy loam with some gravelly streaks. Most of it is well adapted to agriculture, though some is in need of drainage. The bench lands bordering the valley floors are composed of a clay loam shot with gravel or coarse sand. This type of soil is excellent where water is obtainable for irrigation.

Crops: The principal crops are alfalfa hay, oats, wheat, barley, potatoes, and vegetables. Seed peas are an important crop in the Ruby Valley, which has proved one of the best producing sections in the state. The valley also grows premium quality oats and wheat.

Drainage and Water Supply: Irrigation water comes from the Madison, Beaverhead, Big Hole and Jefferson Rivers, besides numerous large mountain streams. All ditches

are owned by farmers with no government developed projects. There is an abundance

of water and an excellent opportunity exists for government projects as the need becomes apparent.

Industries: Other industries in addition to agriculture consist of mining and, to a small degree, lumbering. The Montana Power Company has one of its largest power plants on the Madison River, near McAllister.

Minerals: Mining resources are large and as yet in their infancy. Numerous small mines are being operated and some are developing into plants employing 40 men, while every gulch seems to contain mineral claims, awaiting more favorable conditions for development.

Timber: Timber areas are located mostly in the Madison National Forest reserve. Some excellent timber for milling purposes is found here.

Land Values: The price of land ranges from \$5 an acre for grazing land to \$150 an acre for some of the small diversified farms under irrigation. Generally speaking, land values are low compared to other sections in the Northwest.

Transportation and Highways: The Northern Pacific Railroad runs a branch line up each of the two valleys from their main line at Whitehall. The Yellowstone Trail runs across the northern end of the county and the Vigilante Trail runs from Butte through the county lengthwise to Yellowstone Park. Roads generally in the county are above average and are passable the year around.

Education: Madison County has a total of 58 schools, including six high schools, located at Jefferson Island, Pony, Ennis, Virginia City, Sheridan, and Twin Bridges. The total enrollment for the county is 1,386.

Cities and Towns: Twin Bridges and Sheridan are the largest towns in the county, having a population of approximately 650 each. The State Orphans Home is located at Twin Bridges. Other towns are Virginia City, the county seat, Cameron, Ennis, Jeffers, McAllister, Pony, Harrison, and Jefferson Island, all of which, with the exception of Virginia City, are located in the Madison Valley. In the Ruby Valley, in addition to Virginia City, are Waterloo, Silver Star, Twin Bridges, Sheridan, Laurin, and Alder.

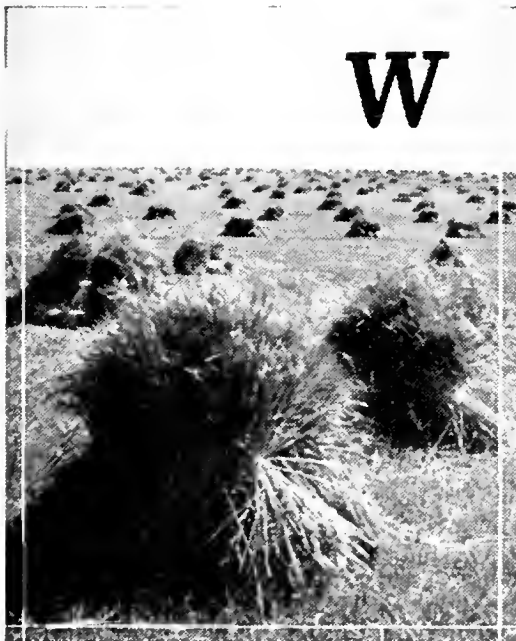
Climatological: The climate is very equitable with a large per cent of sunshiny days. Snow seldom covers the valley floors more than four inches deep and often there is none, while the mountains receive and hold heavy snow falls which supply water for irrigation. Precipitation is around 11 inches during the year in the valleys, most of it coming during the growing season.

Additional Information: For more detailed information about the resources of Madison County write to Secretary of Commercial Club, Twin Bridges, or George E. Gohn, County Clerk, Virginia City, or Secretary, Sheridan Business Men's Club, Sheridan, Montana.

BEAVERHEAD COUNTY

Date of Creation.....	February 2, 1865	Estimated County Population, 1925.....	7,000
Land Area (Approx.).....	5,300 Square Miles	Population, 1920	7,447
County Seat	Dillon	Population County Seat, 1925.....	2,701
Altitude County Seat	5,089 feet	Growing Season.....	May to September

By Frank Hazelbaker.



WITH an area of about 5,300 square miles, Beaverhead County is located in the extreme southwestern corner of the state. Its history dates back to 1862 when gold was discovered at Bannack, early territorial capital of the state. Picturesque scenery abounds and the section is noted for its hunting and fishing. The principal valleys are the Beaverhead, Big Hole, Centennial, Grasshopper, Horse Prairie and Medicine Lodge, each being connected to the main highways by good roads. The county has no bonded indebtedness.

Surface and Soil: The county is bordered on three sides by Continental divides which slope down to wide benchlands and broad valleys. The soil is considered the most productive in the state, being formed largely from the erosion of old shale beds and enriched by the natural process of vegetation.

Crops: Oats and hay are the principal crops though wheat is rapidly increasing. Alfalfa and timothy thrive while wild hay can be cut in all sections. Peas and sugar beets are coming crops as well as field beans, while potatoes and other vegetables, as well as flax, have netted farmers fine returns.

Drainage and Water Supply: The main streams are the Beaverhead and Big Hole Rivers which have countless tributaries, providing an abundant and unfailing water supply.

The Beaverhead drainage supports about 125,000 acres of farm land and the Big Hole over 100,000 acres of hay land. The Lima reservoir supplies 120,000 acre feet and a new irrigation project is now under way to supply the east side of the Beaverhead Valley. The total irrigable area is well over 250,000 acres.

Industries: Stock raising, farming, dairying, mining, milling, meat packing, and lumbering are the important industries. Dillon is a noted wool shipping point and horse market and thousands of head of cattle are fed each winter in tributary valleys. One of these valleys is the famous Big Hole Basin where thousands of head of beef cattle are fattened each winter on the native grasses.

Mineral Resources: Major mining operations are being carried on in the Elkhorn district by the Boston-Montana corporation, where high grade copper ore is being mined and milled. Several carloads of high grade lead and silver ore are being shipped weekly from the Argenta district and silver and gold ore from Bannack. Rich oil prospects exist as well as iron and phosphate, while graphite was exported during the war.

Timber: Timbered area includes 1,135,000 acres, species being Lodgepole pine, Douglas fir, Engelmann spruce, Lumber pine, Balsam fir, aspen and cottonwood. Railroad ties form the chief export.

Land Values: Land values have never been inflated and it is questionable if at the present time there is any place where one could secure greater land values for his money than in this part of the country.

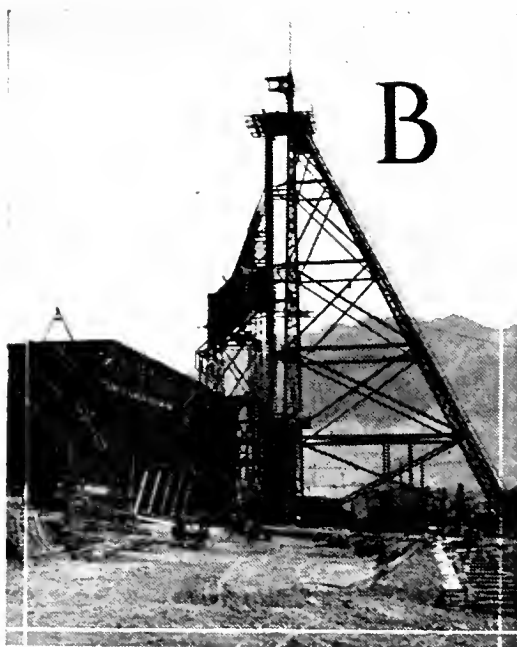
Transportation and Highways: There are approximately 650 miles of roads of which 250 miles are main through highways. There are no hard surface roads but they are of good, natural composition and open for traffic throughout the year. Plans are now under way for important improvements and re-locations. The main highways are maintained under the "Seven per cent" system. All large streams are spanned by steel bridges.

Education: Dillon is the seat of the Montana State Normal College with an enrollment of 700. It has two public schools, a high school, and 39 rural schools. Total county receipts for the last fiscal year, were \$209,303.00. Total attendance for 1925 exclusive of college was 1,448.

Cities and Towns: Dillon is the county seat; Lima, a railroad center; Wisdom, ranching supply center; Armstead, junction point. There are fourteen other postoffice towns.

SILVER BOW COUNTY

Date of Creation.....	February 16, 1881	Estimated County Population, 1925.....	62,000
Land Area.....	698 square miles	Population, 1920	60,313
County Seat.....	Butte	Population County Seat, 1920.....	41,611
Altitude County Seat.....	5,755 feet	Growing Season.....	108 days



BUTTE, the world's greatest mining camp, is to all intents and purposes Silver Bow County. While it was founded and grew to fame upon its mineral resources, it has developed into the largest distributing point in the State and is an important industrial center. In production of butter and packing-house products, it leads the State. The largest city between the Twin Cities on the east and Spokane on the west, and between Salt Lake City on the south and the Canadian border on the north, Butte is an odd and interesting combination of mining camp, modern metropolis, manufacturing point and well-kept residential center.

Silver Bow, the third smallest county, lies in southwestern Montana. The summit of the main range of the Rocky Mountains forms most of its eastern boundary, the Highland Mountains, Camp Creel, and the Big Hole River its southern boundary, while its irregular western and northern boundaries are formed by hills and mountains. The elevation of the county ranges from a minimum of approximately 5,000 feet above sea level to a maximum of 10,000 feet. The growing season is short and the tillable areas small factors which limit the crop production range. Agriculture is influenced by the Butte market. Truck gardening and dairying are its most important phases.

Butte takes its name from the huge isolated butte that stands sentinel-like on the western end of the town. Founded in 1864 as a placer camp, it was nearly deserted January 1, 1875, when William L. Farland re-located the Travona quartz lode and, with nearly every blow of the pick, uncovered ore so rich that it led to the development of the entire district and the building of the greatest mining camp in the world. More than 90 per cent of the total Montana mineral production normally comes from the Butte district, which contains 100 shafts with underground workings totaling 2,700 miles. When working to capacity, the mines employ 15,000 miners, who hoist 20,000 tons of ore every 24 hours. One mining company alone employs in normal times as many metal miners as the states of Colorado, Utah, and New Mexico combined. The Stewart is the deepest operating mine in Butte, casing 3,653 feet from the collar to sump. Through scientific ventilation methods, excessive underground temperatures at the lower levels have been reduced as much as to 15 degrees, and it is believed that when the working ore bodies reach to a depth 5,000, atmospheres that allow of safe and efficient work can be attained. Mammoth electric hoists, permitting operations at the 5,000 foot level, are now being installed.

The total value of the mineral output of Butte since its discovery is variously estimated from a billion to a billion and a half dollars. Copper, zinc, silver, and manganese are the chief ores, although gold, lead, arsenic, and other minerals are obtained as by-products. The normal production of copper ranges from 260,000,000 to more than 300,000,000 pounds a year; of silver approximately 12,000,000 ounces, and of zinc 175,000,000 pounds annually. The large manganese deposits are pronounced by the U. S. Geological Survey as among the most valuable reserves of this metal in the country. Gems, bismuth, antimony, cadmium, brick clay, and clay assay goods are all produced commercially.

Besides being a distributing point for a wide variety of farm and manufactured products, Butte is an important manufacturing center, and the largest consuming market in Montana. Industries include smelters, concentrators, foundaries and machine shops, monumental works, bakeries, creameries, brick, clay, and assay goods, planing and saw mills, meat packing, bottling works, sporting goods, plants making macaroni, overalls, mattresses, saddles and harness, brooms and brushes, tents and awnings, metallic packing and other products.

Butte enjoys the best rail facilities of any city in the State and is strategically located to demand the trade of an interstate region. The main lines of the Northern Pacific and of the Chicago, Milwaukee & St. Paul bring it trade from east and west; the Butte-Great Falls branch of the Great Northern brings it trade from the north, and it is the northern terminus of the Pocatello branch of the Oregon Short Line that brings trade from the south. An electrified rail system, as well as an hourly bus-line service, connects it with Anaconda. The trade from many branch lines in this district naturally gravitates to Butte. The city is also on the principal east and west highways and on two Park-to-Park highways.

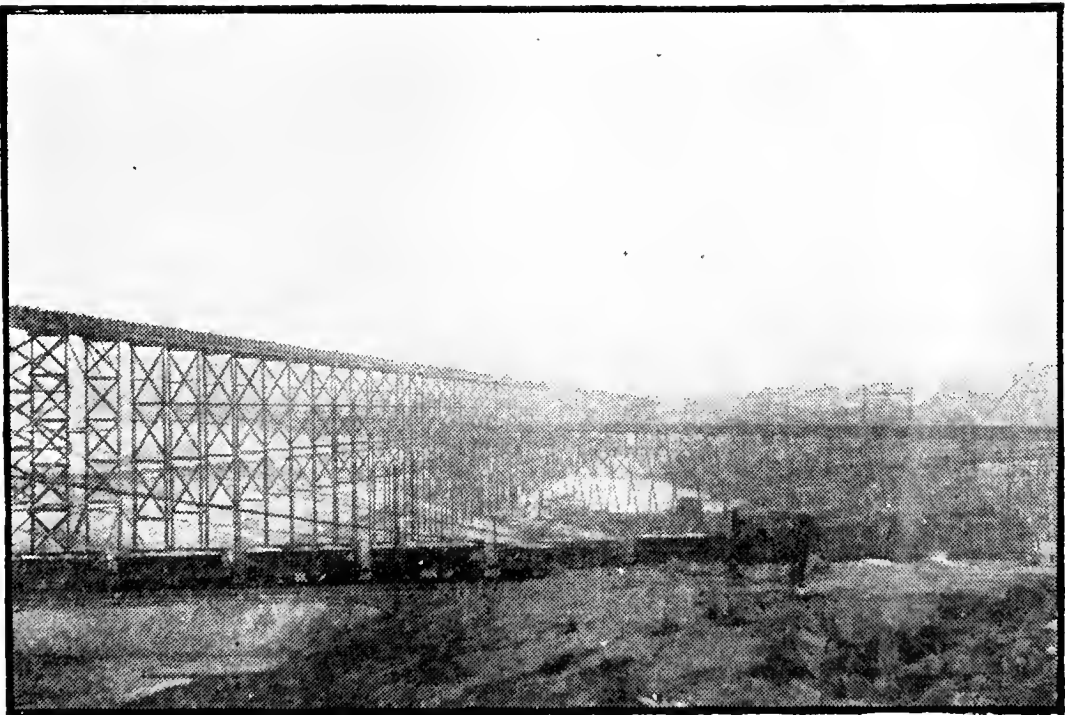
The State School of Mines is located at Butte. Thoroughly equipped and with a large faculty, the school draws students from all parts of this as well as from foreign countries because of its proximity to the world's largest copper mines and mills.

For many years Butte has been one of the unique cities of the country from the sightseer's point of view. Leading the nation in electrically operated mining, milling, smelting and refining enterprises, Butte draws mining and scientific men from all over the world to study the methods used in its mines. Columbia Gardens, Butte's most popular playgrounds, are noted for varieties of flowers which require long sunny days and relatively mild sun heat during the growing season.

Educational: Number of graded schools, 30; enrollment, 6,132. Number of high schools, 2; enrollment, 1,550. Other institutions: State School of Mines, Butte, 112 students and 12 instructors.

Business Statistics: Number of railroads, 6; railway mileage, exclusive of spurs and sidetracks, 155.99; number of manufactures, 125; average number of wage-earners, 25,000; number of banks, 4; number of general stores, 9; confectionery, etc., 116; groceries and meats, 257; lumber yards, 7; total number merchants, 1,045; number of creameries, 6; number of saw mills, 2; number of attorneys, 128; number of physicians, 60.

Additional Information: For more detailed information about the resources of Silver Bow County write to the Butte Chamber of Commerce, Butte, Montana.



Tailings Launder of Butte Mines.

EAST CENTRAL MONTANA



*Growing Season Long and Hot—Acreage Devoted to Corn Leads State—
Large Areas in the Western Part Are Awaiting the Coming of
a Railroad—Irrigation in Yellowstone Valley.*



Three decades ago devoted exclusively to stockraising, crop production has taken the lead in the eastern tier of counties—Richland, Wibaux and Dawson—in East Central Montana, but stockgrowing is the chief wealth producer in Prairie, McCone and Garfield in the western tier. While non-irrigated farming is the dominant method, there being little irrigated land outside of the Yellowstone valley in the southeastern quarter, the irrigated district of Richland county has made good progress toward the establishment of a diversified system of agriculture that includes a generous amount of livestock. Seed production here is important.

The western half is handicapped by inadequate transportation facilities, and development of its resources has been retarded. Spring wheat is the principal crop within hauling distance of the railroad. More remote districts are turning to flax, alfalfa seed and less bulky crops. The district leads all others in corn, which gives good yields of both grain and forage. Swine production is increasing.

Lignite coal abounds. Natural gas has been discovered, and is used in Glendive. Barite, iron potash and clay deposits are reported to exist.

DAWSON COUNTY

Date of Creation	1883	Estimated County Population, 1925.....	9,289
Land Area.....	2,359 sq. miles	Population, 1920	9,239
County Seat	Glendive	Population County Seat, 1920.....	3,816
Altitude County Seat.....	2,071 feet	Growing Season.....	104-131 days

By A. H. Walsh.

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ONE OF the original counties of Montana, Dawson County was formed in the spring of 1883. It then comprised what is now the Counties of Valley, Sheridan, Richland, McCone, Garfield, Prairie, and Wibaux. Glendive, the county seat, is a division point of the Northern Pacific, which maintains there a hospital, shops, and the only supply station for dining cars between St. Paul and the Coast.

Surface and Soil: The land adjacent to many small streams that empty into the Yellowstone is rough and broken, but the uplands between the valleys offer good areas of fertile soils for non-irrigated farming. It is estimated that about 60 per cent of the lands of the county is tillable. The soil is a medium loam with a clay subsoil and is easily worked, warms up readily in the spring and holds moisture well; is very rich in all the elements that make good crops and the use of commercial fertilizer is unknown to the farmers of this county.

Crops: Spring wheat is the principal crop. Other grains grown with success are oats, flax, barley, and corn. Alfalfa produces a good crop. Sugar beets, garden vegetables, and small fruits are also grown. Beans are rapidly coming to the front as a cash crop, and the acreage in corn is being rapidly increased.

Drainage and Water Supply: The Yellowstone River flows in a northeasterly direction through the southeastern part of the county, while the Redwater River cuts its extreme northwestern townships. Many large and small creeks flow into these rivers and



furnish abundant and convenient facilities for water for stock and for irrigation of farming tracts.

Industries: Agriculture and pure-bred stock raising are the chief industries. The flour mills and creameries come next. Diversified farming with special attention to corn raising is becoming an important factor in the growth of the county.

Mineral Resources: Large fields of lignite coal furnish cheap fuel to all sections of the county. Natural gas is found on the Cedar Creek anticline in the southeastern part of the county and is utilized in Glendive for domestic and industrial purposes. Moss agates are found along the Yellowstone River.

Land Values: Irrigated land prices range from \$35 to \$100 an acre; non-irrigated from \$5 to \$50, and grazing land from \$5 to \$10 an acre.

Transportation and Highways: Transportation facilities are good except in the west central part. The main line of the Northern Pacific traverses the southeastern quarter and a branch of this line runs from Glendive down the Yellowstone River into Richland county. The Yellowstone Trail Highway runs through the county.

Education: Dawson county has 80 schools, including two high schools, and a total enrollment of 2,386.

Cities and Towns: Glendive, the county seat, is a beautiful little city with paved streets and all modern conveniences. It has four elevators, a modern mill, a large creamery, four banks, two hospitals, and seven churches. Richey is the second largest town. Stipek, Intake, Bloomfield, Union, and Lindsay are trading centers.

Climatological: The climate is very healthy and favorable for crop growth. Two-thirds of the days are clear and there is an abundance of sunshine. Livestock diseases are unknown. The average rainfall is 15.93, of which 10.95 falls from April 1 to September, during the growing season.

Additional Information: For more detailed information about the resources of Dawson County, write to the Secretary of the Chamber of Commerce, Glendive, Montana.

RICHLAND COUNTY

Date of Creation.....	May 27, 1914	Estimated County Population, 1925.....	9,000
Land Area.....	1,900 sq. miles	Population, 1920	8,989
County Seat.....	Sidney	Population County Seat, 1925.....	1,800
Altitude County Seat.....	1,928 feet	Growing Season.....	120 days

By H. F. DePue.



RICHLAND County is entirely agricultural in character and offers splendid opportunities in various types of farms such as irrigated, non-irrigated, diversified, and live stock. It lies in eastern Montana, bordering North Dakota, between the confluence of the Missouri and the Yellowstone Rivers at an elevation ranging from 1,950 to 2,600 feet. It is approximately 65 miles long by 55 miles wide, comprising irrigated valleys and table lands. Its combination of irrigated and non-irrigated land offers opportunities for growing live stock.

Surface and Soil: The surface and soil of the county is varied in character. The soil is rich and very productive and easily worked. The general topography of the surface is rolling.

Crops: A wide range of crops are produced, consisting of all the small grains, namely: corn, beans, peas, sugar beets, alfalfa, sweet clover, and wheat grass.

Drainage and Water Supply: The drainage of the county is excellent, there being practically no swampy land except a little in the irrigated districts. The general water supply is good. Good wells can be obtained at depths ranging from 10 to 60 feet, and good water for stock is usually found in springs and running creeks.

Industries: The important industries of the county are agriculture and the raising of live stock. A flour mill and sugar factory are located at Sidney, and a coal mine, electric light plant, brick plant, bottling works, and

flour mill at Fairview.

Mineral Resources: An abundance of a good grade of lignite coal is found in practically every section of the country, thereby assuring cheap supplies of fuel.

Timber: There is an abundance of timber, used for wood, along both the Missouri and Yellowstone Rivers.

Land Values: Land values range from \$2 to \$25 per acre for non-irrigated land and from \$20 to \$100 for irrigated land.

Transportation and Highways: The county is traversed by the Great Northern and Northern Pacific Railways. The Great Northern crosses the county from east to west, and the Northern Pacific north and south. The highways are good and practically all sections of the county have graded roads.

Education: The educational system of the county is better than the average. The county has a public school system of over 100 graded schools and four accredited high schools.

Cities and Towns: Sidney, the county seat, is the largest town in the county, with a population of 1,800. Fairview, Lambert and Savage are the other important towns.

Climatological: The climate of the county is healthful and conducive to the production of high grade seeds of all kinds that bring premiums on the markets of the country.

Additional Information: For more detailed information about the resources of Richland County write to Chamber of Commerce, Sidney Montana, or the County Agent, Sidney, Montana.

McCONE COUNTY

Date of Creation.....	April 1, 1919	Estimated County Population, 1925.....	5,000
Land Area.....	2,022 sq. miles	Population, 1920.....	4,747
County Seat	Circle	Population County Seat, 1920.....	300
Altitude County Seat	2,800 feet	Growing Season	90 to 100 days

By Nate H. Bovee.



THE LARGE area of fertile land in McCone County has attracted many farmers. From the Missouri River, its northern boundary, it extends southerly about 55 miles and easterly, from Big Dry Creek, about 40 miles. The Redwater River rises in the southern end of the county and runs through it in a northerly direction. There is good farming land in every section of the county. Towns are located to serve the people.

Surface and Soil: The surface of the county varies from flat river valleys to rough land, generally described as rolling. Soil types vary from a clay loam in the valleys to a sandy loam on the benches. Non-irrigated farming is followed almost exclusively. The soil has an abundance of fertility, retains moisture well and is easy to handle.

Crops: The chief crops are wheat, oats, flax, corn, sweet clover, alfalfa, barley, potatoes, beans and garden truck. Some small fruit is produced for home consumption. Corn is assuming a very important place in the cropping system of the county, 18,000 acres being planted in 1924.

Drainage and Water Supply: Drainage in the county is adequate. Good water is easily accessible for domestic purposes. There are a number of clear springs and creeks with open running water the entire year. Good wells run from 10 to 100 feet in depth.

Industries: Agriculture, live stock, beef and dairy cattle, hogs, horses, sheep, and poultry raising. Diversified farming has brought about an increased interest in the dairy business.

Land Values: Unimproved land brings from \$7 to \$30 per acre, depending upon character and location. The average price for the better class of farm land within a reasonable distance of market is \$15 to \$20 per acre. Lands are classified so that taxes are based upon quality and location.

Transportation and Highways: The county is justly proud of well maintained state and county highways. Good graded roads run in every direction. As most of the hauling is done with motor trucks, it means that roads must be good. Lack of rail facilities at the present time is largely responsible for the exceptionally low prices at which farm lands can be purchased.

Education: McCone County has a splendid rural school system. Circle has a fully equipped high school. Number of schools in county, 61; enrollment, 1,010.

Cities and Towns: Circle, the county seat, is located in the south central part of the county. This town has banks, general stores, a flour mill, creamery and good schools. Brockway, 12 miles south of Circle, serves a larger territory, as does Vida. Other towns and postoffices include: Bonin, Hamblin, Horse Creek, McCone, Nickwall, Paris, Pattonhill, Prairie Elk, Redwater, Riverside, Sand Creek, Watkins, and Weldon.

Climatological: Much sunshine rapidly matures the crops and is responsible for the high quality of McCone county wheat. The annual precipitation is 19.06 inches, approximately half of this amount falling during May, June and July.

Additional Information: For more detailed information about the resources of McCone County write to Nate H. Bovee, Circle, Montana.

PETROLEUM COUNTY

Date of Creation February 22, 1925 Altitude County Seat..... 2,900 feet
 Land Area..... 1,980 square miles Population County Seat..... 600
 County Seat Winnett Growing Season March 1 to October 1

By Ella V. Millsap.



THE NEWEST addition to Montana's 56 counties is Petroleum, which was created from the eastern portion of Fergus county. The surface of the land is generally rolling, with valleys and benches.

Soil: Sandy loam and gumbo.

Crops: Alfalfa, corn, wheat, oats, flax, alfalfa seed, rye, and all garden vegetables.

Drainage and Water Supply: Flatwillow Creek, McDonald, Elk, Yellow Water, Cat Creek, Brush, Dovetail, Dry Blood, Drag Pike, Buffalo, and Musselshell River.

Industries: Farming, stock raising, and oil. There is an oil refinery located at Winnett and there are four grain elevators in the county, located at Winnett, also three small sawmills.

Mineral Resources: The mineral resources of the county consist principally of oil. The Cat Creek field, one of the first oil fields to be developed in the State, is located near Winnett.

Timber: Pine and cedar along Musselshell and Missouri Rivers.

Land Values: Irrigated land sells at \$35 to \$100 an acre; tillable land at \$15 to \$25, and grazing land \$2 to \$5.

Transportation and Highways: The Chicago, Milwaukee & St. Paul Railway, the Pioneer Stage Company, and the Central Montana Highway and the Custer Battlefield Hiway.

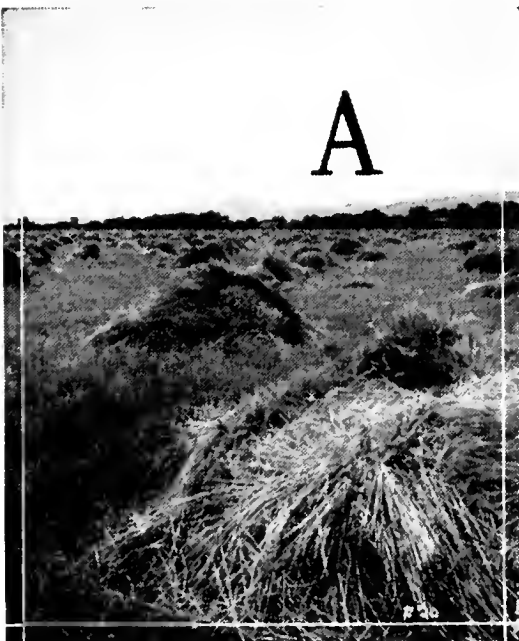
Education: There are 30 schools in the county, including a high school. The total enrollment is 589.

Additional Information: For more detailed information about the resources of Petroleum County write to Ella V. Millsap, County Clerk, or the Secretary of the Commercial Club, Winnett, Montana.

WIBAUX COUNTY

Date of Creation..... August 17, 1914 Altitude County Seat..... 2,635 feet
 Land Area..... 944 square miles Population, 1920..... 3,113
 County Seat..... Wibaux Population County Seat, 1920..... 611
 Growing Season..... 197-116 days

By Chas. E. White.



ALTHOUGH Wibaux County is the third smallest in area of counties in the State, it has the largest percentage of acres under cultivation. It is known as the Gateway County of Montana, for through it the Northern Pacific trains pass on entering the State from the east. While it was known as one of the stock districts in the old range days, today agriculture is its dominant industry.

Surface and Soil: Rolling prairies, table lands and valleys make up the agricultural area, while the grazing lands are devoted to stock raising. The soils of Wibaux County are very fertile and will readily produce all crops adapted to the climate. The best soil is a rich dark loam with a clay subsoil of great depth. It is generally free from objectionable features, holds moisture well and is easily tilled.

Crops: The most important crops grown are wheat, corn, alfalfa, flax, barley, beans, rye, sweet clover, and nearly all kinds of root crops, garden vegetables and some varieties of small fruits. Corn is rapidly becoming one of the important feed crops of Wibaux County. Beans are also making rapid progress, Montana white beans averaging 500 to 900 pounds per acre.

Drainage and Water Supply: Wibaux County is well watered by Beaver Creek, which runs north and south through the county.

Spring Creek and Smith Creek and numerous springs provide abundance of pure water for stock and household purposes.

Industries: Stock raising, dairying, and diversified farming are the industries of the county.

Mineral Resources: Good deposits of lignite coal are within easy reach of almost every farm. This coal may be purchased at the mines at a very low price.

Land Values: Land values vary according to quality and location. Improved non-irrigated lands sell at \$15 to \$40 an acre and unimproved lands at \$5 to \$15.

Transportation and Highways: The main line of the Northern Pacific passes through the county. The Red Trail road follows the Northern Pacific and good dirt roads connect all sections of the county.

Education: There are 43 schools in the county, including two high schools, with an enrollment of 851.

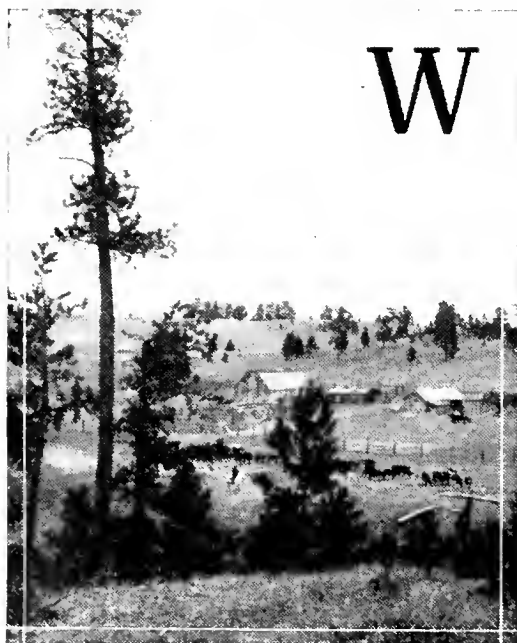
Cities and Towns: Wibaux, the county seat, is a modern, up-to-date town in every respect, with mercantile establishments, grain elevators and all marketing facilities for farmers' products. Carlyle is the second largest town in the county.

Climatological: The annual precipitation is between 14 and 15 inches. About 60 per cent of this falls during the months of May, June and July. Sixty per cent of the days are days of sunshine—one of the reasons for success with corn. The winters are fairly mild.

Additional Information: For more detailed information about the resources of Wibaux County write to Charles E. White, Wibaux, Montana.

PRAIRIE COUNTY

Date of Creation.....	February 5, 1915	Altitude County Seat.....	2,250
Land Area.....	1,685 Square Miles	Population, 1920	3,684
County Seat	Terry	Population County Seat, 1920.....	794
Growing Season.....	104-128 Days.		



WITH a maximum length from the northwest to the southeast of about 75 miles, and an average width of 25 miles, Prairie County is located in east central Montana, midway between the northern and southern boundaries.

Surface and Soil: The surface is rolling, with the exception of the northwestern part which is quite broken due to the low range of the Mountain Sheep Bluffs. Sandy to clay loams are found on the uplands while heavy clay loams predominate in the valley.

Crops: Wheat, oats, corn, barley, flax and hay are the principal crops.

Drainage and Water Supply: Prairie is a well watered county. The Yellowstone River flows northeasterly through the county, and is fed by a number of tributaries. The Powder River is the largest southern branch near the western side while O'Fallon Creek is the largest stream on the eastern side. The northern tributaries are the Brackett, Cedar and Cherry Creeks.

Industries: Agriculture and stock raising are the important industries. Since corn became a standard crop, hog-growing is steadily advancing, the tendency being to increase the holdings of livestock in order that a cash market for corn may be provided.

Mineral Resources: Coal is commercially mined for home markets. Natural gas has been found in the eastern part.

Timber: No commercial stands of timber exist. Cottonwood is found along the creeks.

Land Values: Non-irrigated land may be procured from \$10 to \$75 per acre, while grazing land commands from \$5 to \$15 an acre.

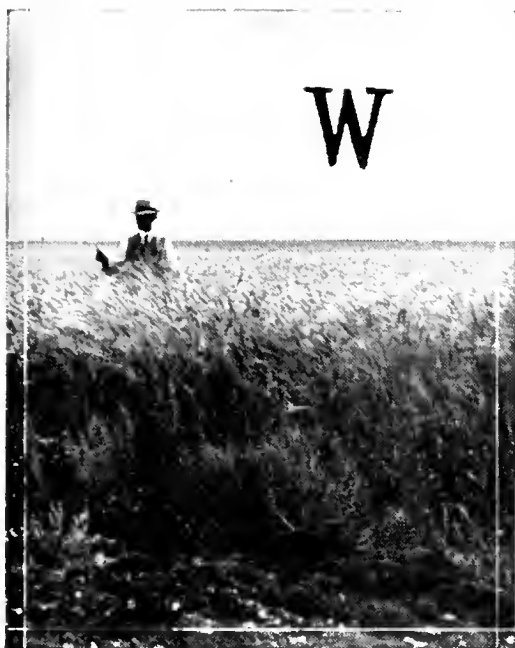
Transportation and Highways: The main line of the Northern Pacific parallels the Yellowstone River across the county as well as the National Parks Highway from the Twin Cities. The main line of the Chicago, Milwaukee & St. Paul enters the southeastern quarter of the county and extends to Terry, whence it follows the Yellowstone River westward.

Education: Prairie County has 61 schools including a high school at Terry. The enrollment is 1,114.

Cities and Towns: Terry, the county seat, is situated in a natural artesian basin. It is the chief distributing center of the county. Other important towns are Mildred and Fallon, the latter being the shipping point for the eastern section.

GARFIELD COUNTY

Date of Creation	April 1, 1919	Altitude County Seat.....	2,800 (est.)
Land Area.....	4,913 Square Miles	Growing Season.....	124 Days
County Seat	Jordan	Population County, 1920.....	5,368
Population County Seat, 1920.....		813	



HERE Garfield County in a position to occupy the rank that its area and position entitle it, it would be one of the most important counties in the state. It is approximately 80 miles long, east and west, and 65 miles wide, north and south. Located in the east central part of the state, it is one of the few counties that has no railroad lines within its borders. However, there is no doubt but that as soon as financial conditions permit, the gap in the Great Northern line between Richey and Lewistown will be constructed. The grade and necessary tunnels have been completed from Lewistown east almost to the western boundary of the county.

Surface and Soil: The surface is generally rolling. The soil types in the Missouri and Musselshell valleys range from clay to heavy clay, while on the uplands a sandy loam is found.

Crops: While small grains such as wheat, oats, barley and rye are the chief crops, owing to the inadequate transportation facilities only enough is raised for local consumption.

Drainage and Water Supply: With the Missouri River forming its northern boundary and the Musselshell River its western boundary, these rivers together with the numerous tributaries which flow into them furnish sufficient moisture for the county.

Industries: Stockraising is the chief industry while agriculture and mining are carried on less extensively.

Mineral Resources: Coal abounds in all parts of the county. Oil has been discovered in the Cat Creek district, in the west end of the county. Chalk has been found in commercial quantities.

Timber: Abundant growths of cottonwood are found along the creeks and small pine along the rivers, but no timber of a marketable value is found.

Land Values: Irrigated lands sell from \$25 to \$50 an acre; non-irrigated farm lands from \$10 to \$25 an acre and grazing lands from \$5 to \$15 per acre.

Transportation and Highways: A stage line from Jordan to Miles City serves the southeastern section of the county; Glasgow receives the trade of the northeastern part, Malta of the northwestern portion and Winnett, Fergus County, of the western part.

Education: There are eighty-six schools, including a high school at Jordan, the enrollment being 968.

Cities and Towns: Jordan, the county seat, is the principal trading center in the central part of the county, while Edwards, Sand Springs and Mosby are the trading centers in the west end. Cohagen is the chief trading center for the southern part of the county.

CENTRAL MONTANA



In Developed Energy Resources Stands in First Place—Most of Its Area Included Within the Mountain Region—Stockraising and General Farming Varied Industrial Development.



Originally a mining and a stockraising region, Central Montana, which extends from the Musselshell river on the east to the crest of the continental divide on the west, and includes the counties of Fergus, Musselshell, Golden Valley, Wheatland, Judith Basin, Meagher, Cascade, Lewis and Clark, Broadwater, Jefferson, and Petroleum, is one of the principal industrial regions of the state. Mining, stockraising and general farming are also important. Diversified agriculture is better established in the western two-thirds, or eastern slope district, than in the eastern third of the plains region.

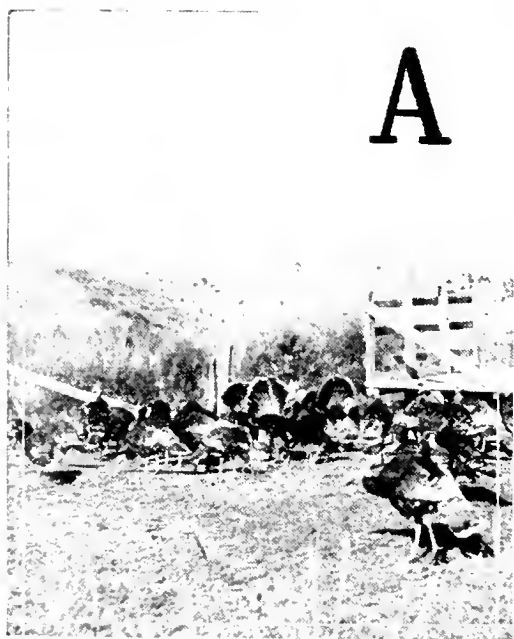
The district ranks first in production of petroleum, in tonnage of coal mined and in developed hydro-electric power. In undeveloped water power it is second. Because of the wheat acreages of Fergus and Judith Basin counties it holds second place on this crop. It also ranks second on potatoes and alfalfa. In the western half are many national forests and other grazing areas.

Zinc, silver, lead, gold and sapphires are mined, as well as coal. The existence of large deposits of commercial iron ore and other minerals of industrial importance are reported. This district is the chief producer of gypsum products.

BROADWATER COUNTY

Date of Creation.....	March 1, 1897	Estimated County Population, 1925.....	3,200
Land Area.....	1,306 sq. miles	Population, 1920	3,339
County Seat	Townsend	Population County Seat, 1920.....	1,200
Altitude County Seat	3,800 feet	Growing Season.....	April to November

By R. N. Lodge.



AGRICULTURE is the chief industry of Broadwater County, which lies in Central Montana and is bordered on the west by the general Rocky Mountain Range and on the east by the Big Belt Mountains. The famous Missouri River and Valley reaches from the southern to the northern boundaries of the county, fifty miles in length, and abounds in wealth with its fertile irrigated and non-irrigated lands. The rolling foothills not only produce hundreds of thousands of bushels of choice Montana hard wheat and other grains, but afford abundance of pasture for the many herds of sheep and stock cattle. The Missouri river and many mountain streams furnish a never failing water supply and contribute to the desirability of the county's location.

Surface and Soil: The general lay of the agricultural land in the Missouri River Valley is level to slightly rolling, and then too, Nature favored the county with long gentle slopes from the rugged mountain ranges to the river. The soil is a rich black mountain ash loam and sandy loam, free from gumbo, with a lime content that assures permanent fertility and seems never to tire of producing.

Crops: Broadwater County is a leader in the production of choice alfalfa hay, wheat, oats, barley, potatoes and seed crops. Corn has been produced successfully; and small grains, vegetables and fruits are of the highest quality. Hay and pasture grass such

as timothy, sweet clover, brome grass and blue joint are extensively raised and are exceptionally nutritious and fattening.

Drainage and Water Supply: The county is favored by natural drainage, a very small portion needing better drainage. The water supply is ample, mountain streams, springs and the Missouri river furnishing water for irrigation for the principal parts of the valley. An irrigation project to furnish water for the Crow Creek Valley has been surveyed by competent engineers and no doubt this summer will mark the beginning of actual work of construction.

Industries: The principal industries are agriculture and stock raising. There are four grain elevators, two located at Toston, and a flour mill, a creamery, two elevators and an ice cream plant at Townsend.

Mineral Resources: There are several large mining properties in the county, producing gold, silver, lead and galena. Marble, coal and granite deposits are as yet untouched. Some aluminum has also been found.

Timber: The timber area is approximately 185,000 acres of high grade native fir and yellow pine.

Land Values: Land values range in price from \$60 to \$100 an acre for irrigated land. Non-irrigated land brings from \$15 to \$30 an acre; meadow land from \$20 to \$25 and grazing land from \$4 to \$6 an acre, the range in price being determined by the quality of the soil and the distance from the railroad.

Transportation and Highways: The Northern Pacific Railway crosses the county from north to south and the Chicago, Milwaukee & St. Paul Railway passes through the southern end of the county. The Park-to-Park Highway, the Electric Highway and the White Trail cross the county, as does the main state east to west highway.

Education: There are 29 schools in the county, including one high school, with a total enrollment of 559.

Cities and Towns: Townsend, the county seat, is the largest and most modern town in Broadwater county. Other towns are Toston, Radersburg and Winston.

Climatological: The climate is ideal. The mountain ranges protect the valleys from the cold winds of winter; the summer days are cool and pleasant. The annual precipitation is 14 to 16 inches.

CASCADE COUNTY

Date of Creation.....	December, 1887	Estimated County Population, 1925.....	45,000
Land Area.....	2,747 sq. miles	Population, 1920.....	38,863
County Seat.....	Great Falls	Population County Seat, 1925.....	29,883
Altitude County Seat.....	3,330 feet	Population County Seat, 1920.....	24,124
Growing Season.....	Average, 138 days		

By S. E. Peterson.

C

CASCADE County is about 60 miles long, east and west, and 50 miles wide, north and south. The extreme southern portion, which is mountainous, is devoted to live stock, small grain farming, silver and lead mining, and some coal mining. The central portion is devoted to general farming and coal mining, and the remainder of the county to grain growing, dairying, diversified farming and stock raising; also some coal mining.

Surface and Soil: The surface is gently rolling. The soil varies from that of a black sandy loam to heavy black loam, with clay sub-soil. Some chocolate loam is found in the foothills.

Crops: Winter and spring wheat and corn for forage and grain are cultivated on the non-irrigated areas, while oats, barley, potatoes, alfalfa, and timothy are raised on the irrigated portions.

Drainage and Water Supply: The Missouri River flowing diagonally through the county, together with its numerous waterfalls, furnishes an abundance of water power. Irrigation facilities are unexcelled, owing to the many tributaries of the Missouri. Flowing from the north and west is the Sun River, having its conflux with the Missouri at Great Falls. The Dearborn and Smith Rivers also traverse the county. Belt Creek, which rises in the Belt Mountains and also flows in the Missouri near Great Falls,

forms another fertile valley. Other important creeks are Highwood, Deep, Hound, and Willow Creeks. Adjacent to the rivers and creeks are fertile valleys and irrigated lands. Approximately 60,000 acres are being irrigated in the county.

Industries: While Cascade County ranks high in crop and live stock production, owing to its natural resources, it outstrips all other counties in value of manufactured products; namely, dairy products, flour, cereals, meat packing products, drugs, soft drinks, ice, ice cream products, candy, vinegar, toilet articles, refrigerators, cigars, furniture, auto



bodies, carpets, shoes, harness goods, engravings, castings, springs, lamp posts, sheet metal, wire, cable, copper, zinc, ferro-manganese, piston rings, brick and tile, gas, oils—fuel, lubricating and other kinds, including gasoline and kerosene, distillate, etc.—machinery, monuments and carved stone, furs and fur garments. The largest oil refinery in Montana is at Great Falls. The largest packing plant between Twin Cities and Spokane, largest combined non-ferrous metal reduction plant in the world, and the largest wire mill (copper) west of the Mississippi River are located in Cascade County. When the additions to the Anaconda Copper Mining Company's smelter are completed, it will be the largest smelter of its kind in the world. It has 1,800 men on its pay-roll.

Mineral Resources: While coal has been the chief mineral product of the county, it also produces considerable quantities of silver, lead, and iron.

Timber: The timber is located in the mountains—in national forests—and is not cut for commercial purposes, but is available for domestic purposes. Farmers obtain timber for posts and general farm use from the National Forestry Service on application.

Land Values: Stock or grazing lands sell from \$10 per acre and up, agricultural non-irrigated lands from \$25 to \$60 per acre, and irrigated lands can be had up to \$150 per acre.

Transportation and Highways: No county has better rail transportation facilities. Ten trunk and branch lines of the Great Northern and Chicago, Milwaukee & St. Paul Railways radiate from Great Falls; 26 passenger trains daily. "Burlington" trains operate over G. N. Ry. through to Kansas City on south, and to Seattle on Pacific Coast. Seven national highways through Great Falls afford auto tourists ample routes. Y/G Bee Line connects Yellowstone and Glacier National Parks, passing through Great Falls.

Education: There are six high schools and 121 graded schools, having a total enrollment of 8,395.

Cities and Towns: Great Falls, the principal city of northern Montana, has 30 miles of street and alley pavements, 20 miles of boulevard, 725 acres of parks and playgrounds, a half million dollar municipally-owned water system, a public natatorium and a city market. The largest towns are Cascade, Belt, Stockett, Neihart, Monarch, Simms, Sun River, and Fort Shaw.

Climatological: The average rainfall is 15½ inches per annum.

Additional Information: For more detailed information about the resources of Cascade County write to Great Falls Commercial Club, Great Falls, Montana, or Cascade Commercial Club, Cascade, Montana.

FERGUS COUNTY

Date of Creation.....	December 1, 1886	Altitude County Seat.....	3,960 feet
Land Area.....	5,198 square miles	Population, 1920.....	28,344
County Seat	Lewistown	Population County Seat.....	5,000
Growing Season.....		99-127 days	

By Leigh Wade.



FERGUS County, in the geographical center of the State, as a real farming section has been barely scratched. For many years Fergus County was the largest in area in the United States, but during the last few years Judith Basin and Petroleum Counties have been formed from the parent county. Yet it is still one of the banner wheat counties of the State in acreage and production.

Surface and Soil: The northern portions are more or less rolling uplands, broken by the Missouri River, which marks the northern boundary. The central and western areas are occupied by mountain ranges, isolated from the main range of the Rockies, considerable portions of which are included within national forests and can be utilized for grazing purposes. There is a large variation in soil types. In the eastern half of the county the prevailing type is a sandy loam underlain with a limestone gravel which is very fertile.

Crops: Winter wheat of a very high grade is grown here and, as a rule, does not winter-kill and is, therefore, a safe and standard crop. Large crops of oats, barley, and rye are also grown. Corn is grown as a feed to some extent, but not commercially. Potatoes, beans, and sugar beets offer great opportunities for specialized farming. All garden crops do well in Fergus County. Timothy and alfalfa seed are also grown commercially.

Drainage and Water Supply: The county is well watered by streams and springs, while in some districts good artesian flows have been found.

Industries: Fergus County boasts two gypsum plants, oil refineries, flour mills, brick and tile plants, oil fields, coal fields, while agriculture and stock raising continue to be the chief industries.

Minerals: This county is rich in minerals, gold, silver, copper, lead, and iron having been discovered and produced in paying quantities. Coal of a good quality abounds

and has a ready local market. Gypsum hills now keep two large plants at Hanover and Heath running full time, while alabaster, soap stone, brick and pottery clay, limestone, and sandstone await intensive development.

Timber: Aside from the timber on the national forests, pine, fir, and spruce are found on the mountain sides and cottonwoods and willows along the streams.

Land Values: Irrigated land is valued at \$25 to \$80 an acre and non-irrigated land at \$5 to \$40 an acre.

Transportation and Highways: A branch line of the Great Northern runs from Lewistown to Great Falls and also serves a rich farming district via Moccasin to Billings and the main line. The Chicago, Milwaukee & St. Paul Railway and branch lines extend to the wheat centers of the county. The Custer Battlefield Hiway runs through Lewistown. The Dominion and Yellowstone Highway from Canada to the Yellowstone Park, the Central Montana Highway, and the National Parks Highways also traverse Fergus county.

Education: There are 162 schools in Fergus County, including seven high schools. The total enrollment is 4,500.

Cities and Towns: Lewistown, the county seat, is a modern little city of about 5,000 population. It has an up-to-date city and county high school, churches of all denominations, civic organizations, and is the distributing point and retail center for central Montana. Denton, Moore, and Grass Range rank next in size. Other towns are Garnell, Straw, Buffalo, Hanover, Heath, Hilger, Roy, Winifred, and Teigen.

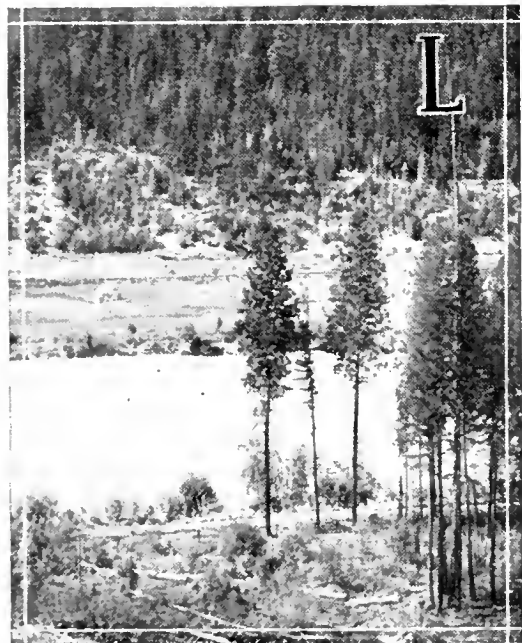
Climatological: With an elevation of 3,000 to 4,500 feet, the winter season in Fergus is largely controlled by the prevailing Chinook winds. The snowfall is seldom more than six inches at any one time, and in the event of a Chinook, this melts very rapidly. The fall is very pleasant and long, winter seldom setting in before December. The summers are reasonably cool. In fact, Fergus has no extreme weather conditions.

Additional Information: For more detailed information about the resources of Fergus County write to the Secretary of Central Montana Chamber of Commerce, Lewistown, Montana.

LEWIS AND CLARK COUNTY

Date of Creation.....	1867	Estimated County Population, 1925.....	19,000
Land Area.....	3,385 sq. miles	Population, 1920	18,660
County Seat	Helena	Population County Seat, 1920.....	12,087
Altitude County Seat.....	4,110 feet	Growing Season, 142 days—May 9-Sept. 29	

By W. G. Ferguson.



LEWIS and Clark County attracted its first settlers by reason of its rich placer gold deposits. For years mining was the principal industry of the county, but live stock raising and agriculture began to come into their own and today have outstripped the mining industry in the amount of wealth produced yearly. Mining today shows greater promise than for years past, but agricultural developments are more than keeping pace, and with more intensive cultivation of the farming lands the value of crops and live stock produced is showing a yearly increase. The county is rich in mineral wealth, with its mountains sheltering large valleys well adapted to agriculture and stock raising. Some of the largest sheep companies in Montana are located in Lewis and Clark County, as the large amount of public lands offers the range necessary for their operations. Cattle and horses are usually found in smaller herds ranging from 200 to 400. There is a large amount of irrigated and non-irrigated land in this county on which remarkable bargains are offered. Many state and federal institutions and offices are located in Helena. United States Veteran's Bureau, Veteran's Bureau Hospital No. 12, United States Regional office, Internal Revenue office and practically every branch of the federal government has an office in this city. The State Capitol is located in Helena,

These federal and state pay rolls give a firm foundation to business conditions.

Surface and Soil: The mountainous topography of Lewis and Clark County carries a wide variation of soils. Both non-irrigated and irrigated lands are typified by soils according to location. The fertile irrigated valleys over the county have soils made up largely of sandy and silty loams. The gumbo type of soils are lacking in all of the valleys. The irrigated bench lands are largely made up of soil types characteristic of the non-irrigated sections. The non-irrigated lands of the county are made up of the clay loam type of soil and are characterized for their moisture holding faculties. The sub-surface soils over the county vary from a heavy hardpan type to a more porous gravelly texture.

Crops: Peas, beans, potatoes, alfalfa, small grains, corn, and all root crops do exceptionally well. Much of the land is suited to sugar beets and this industry is developing rapidly. Some of the largest poultry farms in the State are situated in this county.

Turkey raising is proving a profitable industry. Near Helena there are many truck and dairy farms making good returns to the owners. Hogs are doing exceptionally well.

Drainage and Water Supply: The Missouri River flows northerly through the county and many good-sized tributaries whose source is in the Continental Divide and Big Belt Mountains flow into it. Three large plants are located on the Missouri River. The county ranks second in the State in developed hydro-electric power. The tributaries of the Missouri supply a large amount of the irrigation water for the county.

Industries: Smelting and refining and its allied industries play a big part in the industrial life of the county. Mining is showing greater promise than for a decade past. A new smelter is being planned and many properties being opened up. There are a number of smaller industries in the county.

Mineral Resources: The Helena district is highly mineralized. Several properties give promise of becoming big producers during 1926. Great activity is expected throughout this section of the county.

Timber: A large part of the timber of the county is located within the Helena National Forest. This supplies practically an inexhaustible amount of timber for farm needs.

Land Values: Land offers some remarkable values in Lewis and Clark County. Good irrigated agricultural land can be purchased around \$75 an acre. Land carrying its own water right is valued at \$100 or above. Non-irrigated land farms can be bought at around \$25 an acre. There is a good opportunity to purchase productive farms at reasonable prices.

Transportation and Highways: The Northern Pacific and Great Northern Railways afford splendid transportation facilities in every direction from Helena. Sixty-five per cent of the population of the State can be reached from here at the lowest distributing rate. The markets of Butte, Great Falls, Missoula, Bozeman, and Livingston are within 125 miles of this city.

Education: Lewis and Clark County boasts of a splendid systems of schools. There are 60 graded schools and three high schools in the county. Intermountain Union College and Mount St. Charles College are situated in Helena, making it possible to educate children from the grades through college without sending them away from Helena.

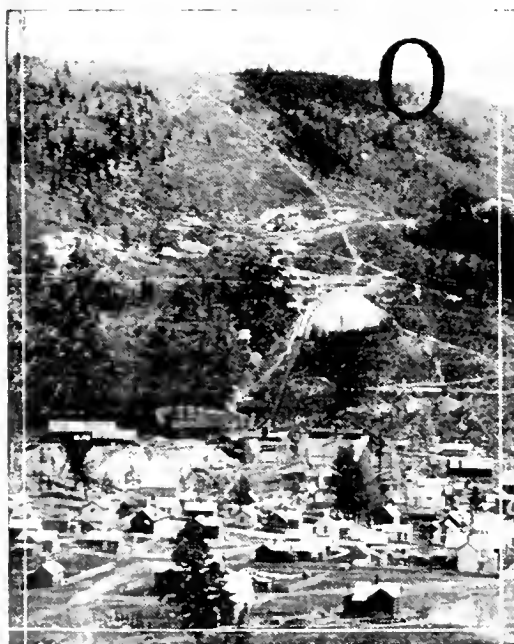
Cities and Towns: Augusta, Gilman, Riebling, Wolf Creek, Lincoln, Marysville, and Rimini are some of the principal towns in Lewis and Clark County. East Helena is the largest town outside of Helena. The smelter of the American Smelting & Refining Company is located there.

Climatological Conditions: Lewis and Clark County has an ideal mountain climate. Since December 27, 1924, the government weather station at Helena has never gone below the zero mark. The government has located its hospital for tuberculars at Helena, indicating its satisfaction with weather conditions prevailing here.

Additional Information: For more detailed information about the resources of Lewis and Clark County write to Helena Commercial Club, or East Helena Commercial Club, East Helena, Montana.

JEFFERSON COUNTY

Date of Creation.....	February 2, 1865	Altitude County Seat	4,919 feet
Land Area.....	1,642 Square Miles	Population County, 1920.....	5,203
County Seat	Boulder	Population County Seat, 1920.....	461
Growing Season.....	82-121 Days		



NE of the original counties of the Territory of Montana, Jefferson County was also one of the largest producers of metal in the 80's and boasted the largest mining pay-roll in the state. Approximately 60 miles long north and south by 40 miles wide, the elevations range from 4,100 feet in the Jefferson Valley at the southern end to 4,919 at Boulder in the Boulder Valley and upwards of 7,000 feet in the mountain ranges. The large areas of mountainous country make it particularly adapted to stock raising. The tillable area which is largely confined to the valleys is small, the principal crops being hay and grains, although vegetables of all kinds are successfully grown. In the irrigated districts around Whitehall, farmers have specialized in potatoes and dairying. The soil of the county is alluvial and rich.

Drainage and Water Supply: The Jefferson River flowing along the southeastern border, is the largest stream; the next largest is the Boulder River, rising in the northern part of the county and flowing southerly, emptying into the Jefferson at Cardwell. There are numerous smaller streams.

Industries: As in the earlier days, mining will continue to be one of the chief industries; the silver-lead mines at Wickes, Corbin, Elkhorn and the Cataract district having produced

many millions of dollars. At Basin is located one of the richest gold mines in the state and in the Uplands district are found rich silver mines. For the past twenty

years economic conditions have caused a marked depression in the mining industry, but it is confidently expected that this year will mark the beginning of a new era in the mining world. Much livestock is ranged on the national forest, while agriculture and dairying are making steady progress.

Mineral Resources: Although the mineral production in the past has been enormous, it is the consensus of opinion that many of the larger mining properties are as yet untouched. The chief metals are gold, silver, lead, copper, some zinc, also manganese, platinum, gems, fire clay, limestone and granite for building purposes. The wings of the State Capitol at Helena are constructed of Jefferson county granite.

Timber: There is considerable merchantable timber, 354,720 acres of the Deer Lodge National Forest and 147,835 acres of the Helena National Forest being included within the county.

Land Values: The price of irrigated land ranges from \$30 to \$125 an acre; non-irrigated land from \$8 to \$25 an acre and grazing land from \$5 to \$10 an acre.

Education: There are 35 schools, including two high schools, with a total enrollment of 919. The State School for the Deaf and Blind and for the Feeble Minded is located at Boulder.

Transportation and Highways: The main lines of the Chicago, Milwaukee and St. Paul and the Northern Pacific cross the southern end of the county; the Butte-Havre branch of the Great Northern runs northerly through the western part of the county. Transcontinental and north and south highways parallel the railroads.

Tourist Attractions: There are three good health and pleasure resorts in the county—the Boulder Hot Springs at Boulder, Pipestone Hot Springs near Whitehall and Alhambra Hot Springs at Alhambra. All have modern hotels, large hot water plunges, individual cabins and other tourist attractions. One of the two national monuments in Montana is the Lewis and Clark cavern, in the southern part of the county. It is said to rival the Mammoth Cave of Kentucky in beauty and impressiveness.

WHEATLAND COUNTY

Date of Creation.....	April, 1917	Estimated County Population, 1925.....	5,500
Land Area.....	36 miles square	Population, 1920	6,500
County Seat.....	Harlowton	Population County Seat, 1920.....	2,200
Altitude County Seat.....	4,200 feet	Growing Season.....	May to Sept., inclusive

By R. H. Dunn.

W

WHEATLAND County lies in central Montana. The Big Belt and Big Snowy mountains mark its northern border, and the lower levels of the Crazy Mountains extend over into the southwestern part. The Musselshell River runs east and west through the middle of the county, and receives the drainage of many tributaries from both the north and the south. The land is generally level, sloping gently toward the Musselshell River. Harlowton, the county seat, is a railroad junction and is so situated as to command the trade of a large territory. Stock raising, diversified farming on irrigated and non-irrigated land are the leading industries of the county, although considerable drilling for oil is being done.

Surface and Soil: Soil on the bottom lands varies from clay to heavy clay loams, underlain in most parts with a gravelly limestone substance. Greater variation is shown on the bench lands and foothills, the soils ranging from sandy to gravelly loams, which are rich in limestone.

Crops: Wheat, oats, barley, flax, alfalfa, timothy, Bromus, corn, and sugar beets are successfully raised, as well as all garden crops. Spring wheat is the principal crop of the county, followed by tame hay, wild hay, winter wheat, etc. Alfalfa is the chief crop in the irrigated districts. On the non-irrigated bench lands sweet clover is grown successfully.

Drainage and Water Supply: The bottom lands of the Musselshell River are largely under irrigation. Steps have been taken for the reclamation of 22,799 additional acres, and it is expected that the irrigation project will be started this year.

Industries: The western part of the county is largely devoted to cattle and sheep raising. Dairying is becoming one of the leading industries. There are nine grain elevators in the county and a flour mill located at Harlowton.

Mineral Resources: Coal is the principal mineral of the county. Some drilling for oil has been done and it is believed there are deposits of gypsum near the Big Snowy Mountains.

Timber: The Jefferson National Forest embraces three sides of the county.

Land Values: Irrigated land sells at from \$50 to \$100 per acre; non-irrigated land from \$5 to \$20 per acre.

Transportation and Highways: Transportation facilities are good. The main line of the Chicago, Milwaukee & St. Paul Railway follows the Musselshell River through the



center of the county. Harlowton, in the geographical center of the county, is a division point where the electrified portion of the road across the mountains begins. The Great Northern Railway runs through the northeast corner of the county. Highways give direct connection with all points.

Education: Number of graded schools, 34; enrollment, 950. Number of high schools, 4; enrollment, 230.

Cities and Towns: Harlowton, 2,000; Judith Gap, 500; Hedgesville, 300; Shawmut, 200, and Two Dot 150.

Climatological: Cool in summer and very moderate in winter.

Precipitation: About 18-20 inches.

Additional Information: For more detailed information about the resources of Wheatland County write to the Harlowton Chamber of Commerce.

MUSSELSHELL COUNTY

Date of Creation..... March 1, 1921 County SeatRoundup
Land Area.....1913 Square Miles Altitude County Seat.....3,184
Growing Season.....141-144 Days

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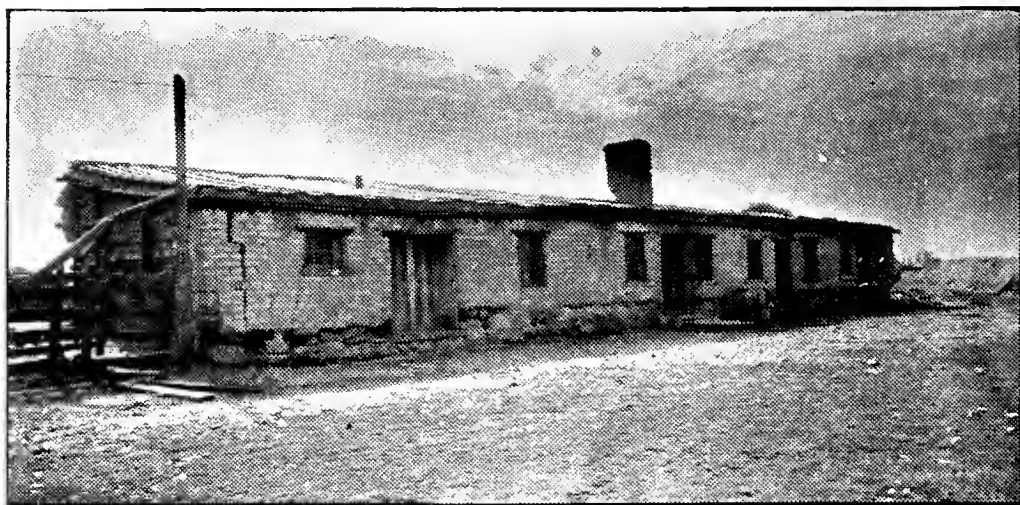
SITUATED just south of the geographical center of the state, Musselshell County is 65 miles from east to west and 42 miles from north to south. It receives its name from the river which traverses the county from east to west, turning abruptly to the north and defining the north half of the eastern border. While there are about 15,000 acres under ditch, non-irrigated farming has made more progress than irrigated farming.

Surface and Soil: In the extreme northern and southern parts of the county and along the Bull Mountains, near the southern border, the land is rolling, and in some places mountainous, consequently being well adapted for grazing, while in the open good crops are produced. The central portion of the county is mostly level, with frequent benches, which produce splendid wheat crops, owing to their adaptability to conserve moisture. The soil varies to a great extent, all being of good depth. Along the river a heavy loam predominates, producing high yields of all grains, corn, alfalfa and garden truck. On the benches a limestone gravel soil is found capable of easy cultivation and producing wheat.

Crops: Both winter and spring wheat are grown, the latter being the main cash crop. Corn also returns good yields of both grain and fodder, while oats, rye, barley, flax, alfalfa,

timothy, clover, potatoes, beans and vegetables of all kinds prosper.

Drainage and Water Supply: Though the principal source of water supply is furnished from the Musselshell River, about 12,000 acres along its banks are irrigated. Several thousand acres of land in the northern portion of the county receive sufficient water from the Willow Creek, Flatwillow and Swimming Woman Creeks. Wells for



Fort Owens, One of Montana's First Trading Posts.

domestic purposes furnish abundant supply on farms, water being found at a depth of 20 to 60 feet in most sections of the county.

Industries: While agriculture and the raising of livestock rank high, the mining of coal is more important.

Mineral Resources: Coal and petroleum have been found in exceedingly large quantities, while a deposit of sapphires exists in the Arkwright Bench district.

Timber: The Bull Mountains and the Snowy Mountains produce timber of a merchantable quality.

Land Values: While the price of land naturally depends upon the location and improvements, irrigated lands sell from \$40 to \$75 per acre; improved land, \$20 to \$75; raw agricultural, \$10 to \$30, while grazing sells at \$5 to \$10 per acre.

Transportation and Highways: The main line of the Chicago, Milwaukee and St. Paul Railway traverses the county from east to west, while the Custer Battlefield highway crosses the county from north to south.

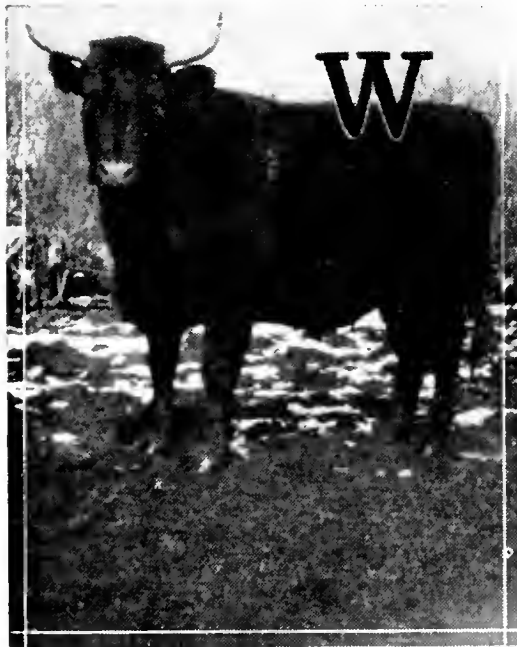
Education: Out of 83 schools in the county, four are high schools, all of which have an enrollment of 2,256.

Cities and Towns: Roundup, the county seat, is a modern, up-to-date community, while the coal mines which are situated within four miles of the city, form an important distributing and shipping point for the farm and stock districts. Musselshell, Melstone and Delphia are other important towns.

Additional Information: For more detailed information about the resources of Musselshell County, write to Roundup Chamber of Commerce, Roundup, Montana.

MEAGHER COUNTY

Date of creation.....	November 16, 1867	Estimated County Population, 1925.....	2100
Land Area.....	2376 Square Miles	Population, 1920	1600
County Seat.....	White Sulphur Springs	Population County Seat, 1920.....	575
Altitude County Seat.....	5280 feet	Growing Season.....	April to September



WITH the Little Belt Range of mountains marking its northern boundary, and the crest of the Big Belt Range its southern boundary, Meagher County is situated in the central part of Montana. The Smith River flows northwesterly through the county, and its valley is the chief one in there.

Surface and Soil: A little more than half of the county is mountainous. The Smith River Valley which is 50 miles long and from 12 to 15 miles wide is practically all irrigated and is the chief farming district. In the eastern end of the county there is some non-irrigated farming. The soil in the valley is alluvial, and on the benches it is a chocolate loam.

Crops: Wheat, oats and barley are characteristic crops as are verified by the numerous prizes received in state competitions. Alfalfa is the principal forage crop under irrigation.

Drainage and Water Supply: Meagher is an exceedingly well watered county. Sixteen Mile Creek, rising in the Castle Mountains, flows west through a canyon into the Missouri at Lombard. Many other streams rising in the mountain ranges on the northern and southern sides of the county flow into the Smith River.

Industries: Farming, stock raising, dairying and mining form the chief industries.

Wheat growing is attractive on account of the high percentage of gluten. Springs Creamery, the output of which is in demand both in Butte and Helena, receives shipments of cream from the entire county.

Mineral Resources: Iron, lead and copper comprise the minerals. At present the iron mining is being developed by eastern interests. A great deal of activity is contemplated during 1926.

Timber: Owing to the vast acreage contained in the National Forests, excellent stands of timber are found in the county. The National Forests which comprise 624,910 acres are divided as follows: 77,722 acres in the Absaroka Forest, 1,065 in the Gallatin Forest, 133,489 acres in the Helena, and 413,634 acres in the Jefferson Forest.

Land Values: There are some bargains in land; good irrigated lands may be had from \$40 to \$50 per acre, while grazing land is available at from \$5.00 to \$7.50 per acre.

Transportation and Highways: The main line of the Chicago, Milwaukee and St. Paul traverses the southern part of the county, and a branch line from Ringling run. to White Sulphur Springs, 18 miles north. The National Park-to-Park Highway and the Electric Highway traverse the county also.

Education: There are 26 schools having an enrollment of 459. The county high school and a newly built grade school are located at White Sulphur Springs.

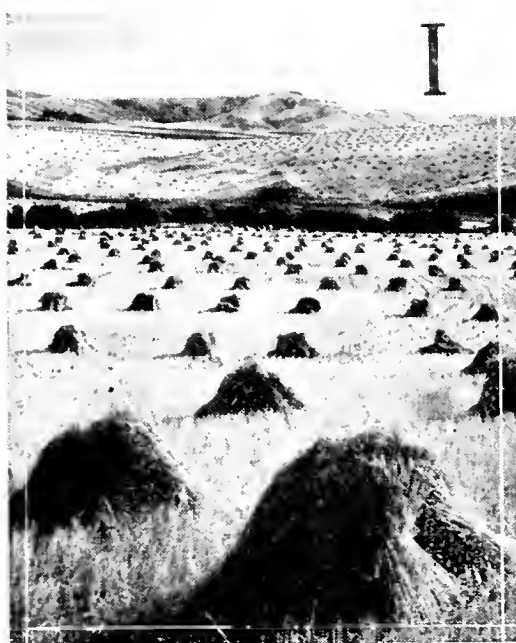
Cities and Towns: White Sulphur Springs, the county seat, is the only town of importance. It is well built and modern. Ringling is a shipping and distributing point for a considerable area.

Additional Information: For more detailed information about the resources of Meagher County, write to the Commercial Club, White Sulphur Springs, Montana.

JUDITH BASIN COUNTY

Date of Creation..... December 10, 1920 County Seat Stanford
Land Area..... 1,894 square miles Altitude County Seat 4,200 feet
Growing Season..... 114 days

By Charles R. Mountjoy.



INCLUDING within its area the great Judith Basin, recognized as the best non-irrigated district in the State, Judith Basin County is rapidly winning prominence as an agricultural county. Situated in central Montana, with a maximum length and breadth of approximately 50 miles, the crest of the Little Belt Range of Mountains defines its southern and the Highwood Mountains its northern border.

Surface and Soil: The land adjacent to the two mountain ranges is rough and broken. The chief agricultural districts are found in the eastern two-thirds of the county. The bottom lands along the streams are used for hay and root crops, the bench lands for grain growing, and the foothills for timothy and native grasses. The top soil is a brown or chocolate-colored loam. The subsoil is clay and both are intermixed with lime.

Crops: Wheat, both winter and spring, is the leading cash crop. Alfalfa and timothy give good yields. Oats, barley, and rye are staple crops. All kinds of garden crops are successfully grown.

Drainage and Water Supply: The Judith River, in the eastern half of the county, is the largest stream in the county, but numerous mountain streams all flowing north, traverse the county. Springs are found in many districts, and wells can be obtained at depths ranging from 15 to 75 feet.

Industries: Agriculture and stock raising are the chief industries.

Minerals: Large coal deposits exist in the county, but the main operation is at Lehigh. Mining for gold, silver, and copper is being done on a small scale. The sapphire production of the county averages about \$200,000 a year. The output, however, is regulated by the market demand.

Timber: About one-fifth the area of the county is included within national forests.

Land Values: Grain lands range in price from \$40 to \$95 an acre. Stock ranches and diversified farms can be purchased at \$20 to \$40 an acre.

Transportation and Highways: The Billings-Shelby line of the Great Northern, used by the Burlington for its transcontinental trains, runs northwesterly through the heart of the agricultural districts, and is paralleled by the Custer Battlefield Hiway. Other highways connect the county with Lewistown, Great Falls and points south.

Education: There are 59 schools in the county, including six high schools. The total enrollment is 1,559.

Cities and Towns: Stanford, the county seat, and Hobson are the most important towns. Other towns are Mendon, Moccasin, Windham, Spion Kop, Geyser, Benchland, Utica, and Lehigh.

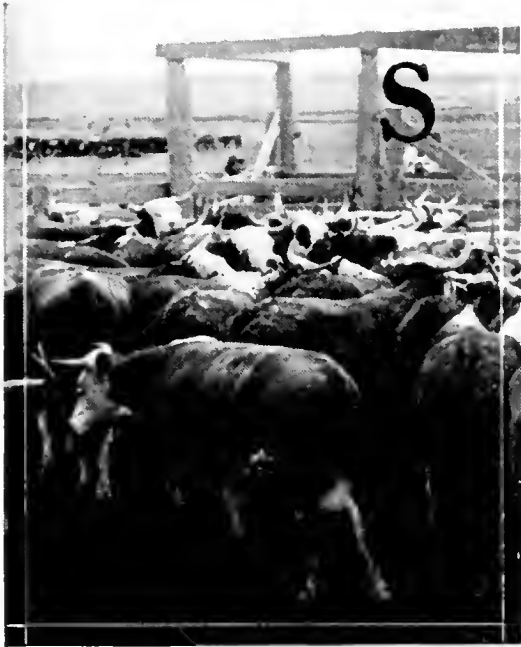
Climatological: Climatic features of 1925 were: An early spring with a wet June, followed by drouth and high temperatures; a cold October and subsequent very mild weather. Wind movement and evaporation were above normal.

Additional Information: For more detailed information about the resources of Judith Basin County write to the Secretary of the Commercial Club, Stanford.

GOLDEN VALLEY COUNTY

Date of Creation.....	June 21, 1920	Estimated County Population, 1925.....	1,590
Land Area.....	1,158 square miles	Population, 1920	About 7,000
County Seat.....	Ryegate	Population County Seat, 1920.....	525
Altitude County Seat...	3,632 feet	Growing Season.	160 days

By H. G. Jacobson.



SITUATED in the south central part of the State, Golden Valley County is almost wholly agricultural. The timber reserve in the Snowy Mountains in the northern part of the county are attractive to the stockmen where their herds can pasture in the summer, and the foothills to the south are ideal in the winter time. That part of the county south of the Musselshell River is more developed as an agricultural district. The entire county is well supplied with creeks of pure water.

Surface and Soil: The surface is rolling, the main drainage being into the Musselshell River. The soil varies from a sandy loam to a heavy gumbo. Rougher portions are covered with nutritious grasses.

Crops: The tillable area, comprising about 50 per cent, is devoted to raising of small grains such as wheat, oats, rye, barley, and corn. The corn acreage gradually increases each year.

Drainage and Water Supply: Musselshell River crosses the county from west to east, fed by numerous creeks which drain the entire county. The streams which rise in the Snowy Mountains furnish waters for irrigation.

Industries: The dairying industry is now an important factor in prosperity. The growing of turkeys has in the past few years made great headway, several carloads having been shipped within the past two years. The raising of

cattle and sheep is an old and well established industry in this county.

Mineral Resources: The commercial production of coal is small, and confined to fuel for local needs. The existence of alabaster is reported from the north end of the county. Several potential oil structures have been mapped by geologists and some drilling has been done.

Timber: Lumbering is carried on on a small scale in the foothills of the Snowy Mountains in the north end of the county.

Land Values: Land values vary from the cheaper grazing land at \$4 per acre to the developed agricultural land at \$25 per acre, while the irrigated land along the Musselshell River and creeks sells at a much higher figure.

Transportation and Highways: This county is very fortunate in the matter of transportation. It is served by the transcontinental line of the Chicago, Milwaukee & St. Paul Railway, which follows the Musselshell River through the southern portion of the county, as well as the Great Northern crossing the county diagonally from north to south. There are 940 miles of county roads and highways.

Education: There are 47 school districts in the county which provides ample school facilities. There are also four accredited high schools in the county.

Cities and Towns: Ryegate, on the Milwaukee, is the county seat. Ryegate, Lavina, Barber, Belmont, and Franklin are other important trading centers.

Climatological: The mild winters make this part of Montana attractive not only to the farmer but the stockman as well. The summers are also favored by the cool breezes from the Crazy Mountains on the west and the Snowy Mountains on the north.

WEST CENTRAL MONTANA



Diversified Farming, Fruitgrowing, Lumbering and Smelting Are the Principal Industries—First in Dairying—Located on the Pacific Slope Side of the Mountains.



A pleasant land of timbered mountains, fertile valleys and clear streams, West Central Montana, lying on the Pacific slope side of the Rocky Mountains, embraces the counties of Powell, Deer Lodge, Granite, Missoula, Ravalli and Mineral counties. The principal industrial activities are smelting, lumbering and mining. Its agriculture is diverse in character and well established. It is one of the principal fruitgrowing regions of the state, ranks first in dairying and potato production and third in tame hay acreage. It ranks second in lumber production. Its smelters at Anaconda are the largest in the world.

In the eastern part of this region, in Powell and Granite counties, stockraising and general farming predominate, while in Ravalli and Missoula counties, dairying, horticulture, swine and poultry production are becoming increasingly important.

Lumbering is confined to the western and mining to the eastern and south-eastern districts. Granite county produces annually more manganese than all the rest of the United States. Tremendous beds of phosphate are found, which the U. S. G. S. reports are of commercial importance and of higher grade than deposits in the southern states. They have not been developed.

MISSOULA COUNTY

Date of Creation	February 2, 1865	Altitude of County Seat	3,223 feet
Land Area	2,660 sq. miles	Estimated County Population, 1925	25,000
County Seat	Missoula	Population County Seat, 1920	12,668
Growing Season	115 days		

By W. M. Flaherty.



IN WEST Central Montana, Missoula County is midway between the north and south boundaries. The Idaho-Montana boundary defines the border of the southwestern corner. All of the county is in a mountainous region with the Missoula and Grass Valleys in the central part of the county, all irrigated and agricultural, comprising 70,000 acres. The Bitter Root Valley, in the south central part, and the Blackfoot Valley, in the east central district, are narrow and fertile valleys. There are 25,000 acres of the Blackfoot in Missoula County.

Surface and Soil: Soil types range from sandy and clay loam in the valleys and on the lower benches to coarse gravel on the higher elevations.

Crops: In the Big Blackfoot Valley the principal crops are grain and hay. Considerable stock is also raised. In the other agricultural districts small grains, alfalfa, apples, and bush fruit, potatoes, and garden truck are the principal crops. Dairying and hog raising are well established. Sugar beets are also grown successfully throughout the county.

Drainage and Water Supply: The sources of water supply for all irrigation streams are from the many mountain streams fed by snow and glaciers. The principal streams are the Missoula River, entering the county at the extreme southeastern corner. The Bitter Root

and Blackfoot Rivers flow into the Missoula River in the county.

Industries: The Missoula and Grass Valleys near Missoula, containing 70,000 acres, the lower Bitter Root, of which 20,000 acres are within the county, and the lower Blackfoot, of which about 20,000 acres are also within the county, are important agricultural sections. This county leads the State in the production and manufacture of lumber and lumber products. Other industries include car shops and round-houses of the Northern Pacific Railroad, several wood-working shops, metal-working plants, brick, tile and concrete works, flour, creameries, and factories using the by-products of the farms.

Mineral Resources: Missoula County has few commercial deposits of mineral, although there are to be found several deposits of gold, silver, lead, and copper. Some coal is mined near Missoula.

Timber: The timber lands of the county are very extensive. The eastern half of the county is almost solid timber land, as is also the southwestern part. Missoula has the largest saw mill capacity of any county. Much timber from other counties is made into lumber in these mills. At Bonner, seven miles from Missoula, is a plant with an annual capacity of about 100,000,000 board feet; at Milltown, near Bonner, is another mill with a capacity of about 40,000,000 board feet, while in Missoula one institution mills about 20,000,000 feet annually. Smaller mills throughout the county have a combined capacity of perhaps 5,000,000 board feet.

Land Values: The average value of improved irrigated land ranges from \$65 to \$125 per acre and improved non-irrigated land ranges from \$45 to \$65. Small improved tracts near the city sell from \$350 to \$600 per acre.

Transportation and Highways: The main lines of the Northern Pacific and the Chicago, Milwaukee & St. Paul traverse the county near the southern boundaries. Branch lines of the Northern Pacific serve the Bitter Root and Flathead Valleys. The Milwaukee road has built a branch a short distance up the Blackfoot Valley and plans are now being made to continue this branch into the lumber districts of the upper Blackfoot. Splendid highways and National trails enter the county.

Education: Missoula County is the educational center for western Montana. It has 42 schools with an enrollment of 3,832, the State University being located in this county. This is the first higher institution of learning to give academic recognition to the profession of public relations.

Cities and Towns: Missoula is one of the largest cities in the State. The State University and the headquarters of the United States Forest Service District No. 1, embracing several states, are located there.

Fort Missoula, known as the "Million Dollar Post" because of its excellence in construction, is located just west and south of Missoula. A battalion of the Fourth Infantry is now stationed at the fort. The monthly payroll is nearly \$19,000.

Beautiful drives, well-stocked streams, hunting, and a wide variety of outdoor sports, together with beautiful sections of scenery, are among the tourist attractions.

Additional Information: For more detailed information about the resources of Missoula County write to Missoula Chamber of Commerce, Missoula, Montana.

POWELL COUNTY

Date of Creation	January 31, 1901	Estimated County Population, 1925.....	7,287
Land Area	2,549 square miles	Population, 1920	7,587
County Seat	Deer Lodge	Population County Seat, 1925	3,600
Altitude County Seat	4,519 feet	Growing Season.....	90-110 days

By F. A. Asbury.

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FOFTY forested mountains form the boundaries of two large valleys in Powell County. Elevation of the agricultural lands runs from four to five thousand feet, while the taller peaks rise to heights of ten thousand feet and more. There are numerous streams fed by the snows of the mountains, which in turn yield waters for irrigation of abundant crops. Wonderful scenery abounds in all parts of the county.

Surface and Soil: Most of the area of Powell County is mountainous. The soils vary from a rather light sandy loam to fairly heavy clay and silt loams. Parts of both the Blackfoot and Deer Lodge Valleys have been rather heavily glaciated and in places the rolling moraines are very noticeable. Drainage is required on some low lands.

Drainage and Water Supply: The Blackfoot River offers abundant water for future use. With the development of a number of reservoir sites, considerably more land can be brought into use for farming. Fine drinking water abounds in the county. The waters of the Deer Lodge River are not safe for irrigation until after they have reached a considerable distance below Deer Lodge, because of the waste products of mining which they carry.



Crops: The agriculture of the county consists mainly of the livestock industry. The majority of the farm lands are given over to raising of forage crops for winter feeding. Forest reserves furnish large areas of summer pasture for stock, in addition to which

there are a number of large tracts of privately owned pastures. The Deer Lodge Valley also raises a considerable crop of potatoes. Vegetables are raised to a small extent. A considerable amount of grain is also raised, but it is not so important as are some of the other crops. Sheep raising is first.

Industries: In Deer Lodge is located the shop equipment of the Chicago, Milwaukee & St. Paul Railway. This is the largest industry of this nature in the county. Some men are employed in the mines and in the making of lime at the Elliston plant. Small scale lumbering is gaining a foothold.

Mineral Resources: The county holds a large store of potential mineral wealth and has yielded large sums in placer gold in the past. There are still some fields suitable for dredging with a possibility of rich results. Several rather promising deposits of ore await the entrance of better transportation facilities. Large deposits of phosphates are found in parts of the county, while copper, gold, silver, and lead indications are not lacking.

Timber: Powell county is rich in timber resources, although as yet there is no large scale lumbering. Some of the area under the national forests is contained in Powell county. There are great possibilities for an increasing lumber industry in the county.

Land Values: Agricultural land prices vary from \$15 to \$120 an acre, depending upon location, altitude, markets and crop adaptability.

Transportation and Highways: The Northern Pacific and Chicago, Milwaukee & St. Paul Railways cross the southern part of the county. The Helena branch of the Northern Pacific serves the Little Blackfoot Valley and the country tributary to it. Highways reach all farming sections. An area of about 324 square miles in the northern end of the county is reached only by pack trails.

Education: There are 38 schools in the county, including one high school. The total enrollment is 1,141.

Cities and Towns: Deer Lodge, the county seat, is the only city in the county. Elliston, Avon, Garrison, and Gold Creek are small towns along the railroads. Helmville and Ovando are inland towns in the Blackfoot Valley.

Climatological: The annual precipitation averages from 11 inches in the Deer Lodge Valley to around 20 inches in the Blackfoot Valley, with higher marks in the neighboring high mountains. The summer temperature seldom passes 90 degrees, and the nights are always cool. The majority of the winters are very pleasant, although an occasional drop in temperature is experienced.

Additional Information: For more detailed information about the resources of Powell County write to the Secretary of the Commercial Club, Deer Lodge, Montana.

DEER LODGE COUNTY

Date of Creation.....	February 2, 1865	Altitude County Seat.....	5,288 feet
Land Area.....	746 Square Miles	Population County, 1920.....	15,323
County Seat	Anaconda	Population County Seat, 1920.....	11,668
Growing Season.....		.....	86 Days



D

DEER LODGE, one of the original nine counties of Montana, with the northern half on the Pacific coast slopes and the southern half on the Atlantic coast side of the continental divide, is primarily an industrial county. The largest copper smelter in the world is located in Anaconda, the county seat and here is treated one-fourth of all the copper ore produced in the United States. When operating at capacity, the smelter employs 4,000 men. In addition to the smelter there have been erected plants for the manufacture of by-products, such as arsenic, sulphuric acid and super-phosphate fertilizer. These plants are the producers of the largest supply of unrefined arsenic in the United States and the second largest of refined white arsenic. The sulphuric acid plant has a capacity of 70,000 tons a year, and the phosphate plant of approximately 30,000 tons a year. The phosphate rock is shipped from mines at Conda, Idaho. A fire brick plant is operated in connection with the smelter. A large foundry, boiler and machine shop is also operated which does custom work as well as work for the smelter and the mines.

Some farming and truck gardening is carried on in the Deer Lodge Valley, on the Pacific coast slope. Stock raising is the principal industry on the eastern side of the mountains, winter forage being put up along the

Big Hole River, while good summer range is found in the national forests that occupy more than one-half the total area of the county.

Drainage and Water Supply: The Big Hole River, forming a portion of the southern boundary of the county, and the Deer Lodge River through the northern part, are the principal streams. Numerous tributaries rising in the high mountains feed these streams.

Mineral Resources: While most of the ore treated in the Anaconda plant comes from Butte, there are a number of mining districts in the northern end of the county. Gold, silver, copper, lead and zinc have been produced in commercial quantities. There are also deposits of coal and limestone, and sapphires have been found along Dry Cottonwood Creek.

Land Values: The price of irrigated land ranges from \$40 to \$100 an acre, non-irrigated farm lands from \$10 to \$40, and grazing land from \$5 to \$10 an acre. There are 4,154 acres of patented mineral ground in the county.

Timber: There are 305,140 acres of the county included within the Deer Lodge National Forest. Considerable timber is cut each year.

Transportation and Highways: The main lines of the Northern Pacific and of the Chicago, Milwaukee & St. Paul Railways follow the Deer Lodge River west, and two east and west highways traverse the county. The city of Anaconda has nearly ten miles of paved streets. Ten miles of the main highway in Deer Lodge County between Anaconda and Butte are paved. Anaconda is the home office of the Intermountain Transportation company running the highest class of auto busses between Anaconda and Butte, Deer Lodge, Philipsburg and Hamilton, a combined distance of 136 miles.

Educational: There are 20 schools, including one high school, with a total enrollment of 2,049.

Cities and Towns: Anaconda, modern and up to date in all respects, is the only city in the county. Beautiful scenery is found in the mountains, and attractive Alpine lakes. The smokestack at the smelter is the highest in the world—585 feet. A large fish hatchery is maintained at Anaconda from which many streams are stocked annually. Other institutions in the county are the State Hospital for the Insane at Warm Springs, and the State Tuberculosis Sanitarium at Galen.

Additional Information: For more detailed information about the resources of Deer Lodge County, write to the Secretary, Commercial Club, Anaconda, Montana.

MINERAL COUNTY

Date of Creation	August 4, 1914	Estimated County Population, 1927	2,300
Land Area	About 1,500 square miles	Population, 1920	2,300
County Seat	Superior	Population County Seat, 1920	550
Altitude County Seat	2,725 feet	Growing Season	April 1 to November 1

By John McMillan.

M



MINERAL County is located in the extreme western end of the State, next to the Idaho line. The crest of the Coeur d'Alene Mountains mark its northern boundary and the crest of the Bitter Root Range its western boundary. Nearly all of the county is included within the Lolo National Forest, which provides excellent grazing for the thousands of sheep turned on the forest each grazing season.

Surface and Soil: Composed principally of picturesque mountain ranges, the county is practically cut in two by the Clark's Fork of the Columbia. The valley of the river makes one of the longest and most fertile spots in the State, though in places the valley is narrow. The soil is principally a sandy loam.

Crops: Wheat, oats, rye, barley and corn. Potatoes and all other root crops, garden truck, fruits and berries of all kinds, and hay are raised in abundance. The land yields excellent crops.

Industries: Lumbering and mining are the chief industries. Agriculture is assuming an important place in the growth of the county.

Mineral Resources: The patented mining claims in Mineral County comprise 4,375 acres. Silver, lead, gold, and copper are the principal metals found. Large amounts of placer gold have been taken from the streams emptying into the Clark's Fork from the south.

Timber: The national forest timber in Mineral County is estimated at 1,200,000 M. feet. In addition, there is a large acreage of private holdings. Mineral is one of the most heavily timbered counties in the State.

Land Values: Irrigated lands, \$25 to \$50 an acre; non-irrigated, \$10 to \$30 an acre, and grazing lands, \$5 to \$15 an acre.

Transportation and Highways: The main line of the Chicago, Milwaukee & St. Paul traverses the county east and west, and a main line of the Northern Pacific runs through the eastern half of the county as far west as St. Regis. From St. Regis a Northern Pacific branch line runs westward and taps the Coeur d'Alene mining district of Idaho. A main east and west highway parallels the railroads.

Education: There are 12 grade schools in the county and four accredited high schools, the total enrollment being 529.

Cities and Towns: In addition to Superior, the county seat, other towns are Alberton, Iron Mountain, St. Regis, DeBorgia, Haugan, and Saltese.

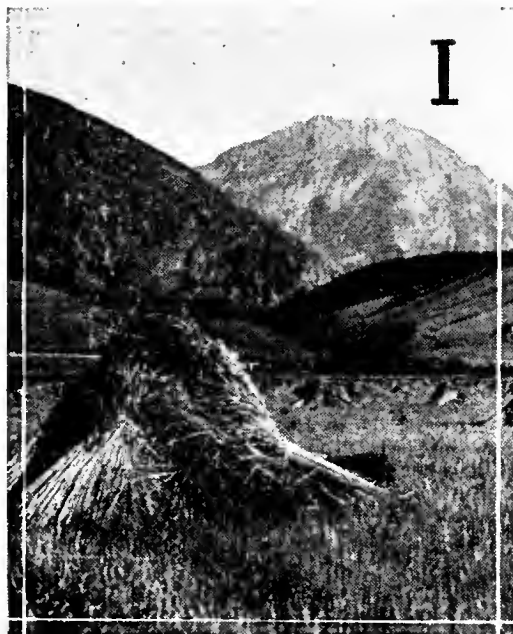
Climatological: Early and mild spring weather; summers moderately cool; nice fall with much Indian Summer weather; winters usually mild.

Additional Information: For more detailed information about the resources of Mineral County, write to the Secretary of the Commercial Club at Superior.

RAVALLI COUNTY

Date of Creation.....	April 1, 1893	Estimated Population, 1925.....	10,190
Land Area.....	2,391 square miles	Altitude County Seat.....	3,600 feet
County Seat.....	Hamilton	Growing Season.....	125-130 days
Population County, 1920.....	10,000	Population County Seat.....	2,000

By Bessie Monroe.



IN THE western part of Montana lies Ravalli County, which was created from the southern portion of Missoula County in 1893. It is bounded on the west by the Idaho line, which follows along the jagged range of the Bitter Roots, on the east by the Granite County line, which follows along a spur of the Rockies, and on the south by the Continental Divide. It comprises the greater portion of the Bitter Root Valley, which extends northerly and southerly for approximately 70 miles with a maximum width of about 18 miles.

Surface and Soil: The Bitter Root Valley is rolling, with considerable slope near the foothills, which in places are succeeded by bench lands. Some of these bench lands have been placed under the ditch. The soil in the valley varies from a gravelly light soil to a deep loam.

Crops: Alfalfa, clover, timothy, and various grasses combine with oats, wheat and other grains for ideal feed for dairy stock and all farm animals. Bitter Root Valley orchards have won fame for the county with the McIntosh Red apple, though the apple is no longer the leading product. Peaches ripen successfully at Hamilton, and all small fruits do well in the valley. Cherries grow very extensively, and melons, tomatoes and other semi-tropical things do exceptionally well, ripening early. Carloads of strawberries have been shipped through the

summer, the last car being billed for Chicago October 9.

Drainage and Water Supply: An almost unlimited water supply comes from mountain lakes reservoired by irrigation districts. The Bitter Root River and its tributaries are tapped at intervals for irrigation canals. The Bitter Root Valley, which is synonymous with the county borders, is rated as the best irrigated valley in the northwest. The river has a gradual fall from its source to Missoula, where it flows into the Missoula River.

Industries: Chief of the industries in Ravalli County is agriculture. Diversified farming is conceded to be the proper procedure for the well adapted soil, which permits of excellent drainage. Beef cattle are extensively raised in the Ross Hole section in the south end of the Bitter Root Valley, and sheep are ranged there the year around; several big flockmasters having holdings in this section. Dairying is also extensively carried on.

Mineral Resources: The county has 4,364 acres of mineral lands; gold, silver, lead and other minerals having been discovered in paying quantities. There is a deposit of bituminous coal in the south central part of the valley which has been worked in a small way for the past 20 years. Placer gold diggings at Hughes Creek, in the southwest part of the county, have yielded a fair amount of nuggets. Development work is being carried on in several parts of the mining territory.

Timber: The Bitter Root National Forest contains a total of 2,217,876 thousand feet of timber of the western yellow pine, lodge pole, Douglas fir, larch, white, and Alpine fir. There are 3,620 acres of pure forage type of grazing land within the forest.

Land Value: The county has 103,461 acres of agricultural irrigated lands with an assessed valuation of \$55.09 per acre. The total acreage of non-irrigated farm lands is 27,035, and this type is valued at \$12.72 per acre. Grazing land privately owned has an extent of 229,035 acres. Timber lands privately owned total 77,730 acres, and the assessed valuation is \$20.43.

The Bitter Root Irrigation District is a municipal corporation organized under the Montana Laws for Irrigation Districts. It is located in Ravalli County, Montana, on the east side of the Bitter Root Valley, from 25 to 50 miles south of Missoula and in the vicinity of the towns of Florence, Stevensville, Victor, Corvallis and Hamilton, and is served by a branch line of the Northern Pacific Railway.

The average elevation of lands in the district is 3,600 feet above sea level. School facilities and roads are excellent and the National Park to Park Highway traverses the

district. The farming population of the district is about 650, not including those residing in the adjacent towns. There are about 330 owners of tracts of 20 acres or less, 115 owners hold 20 to 80 acres and only 27 owners hold more than 80 acres. The average irrigable area of all farms is 44.3 acres.

The soil is a sandy loam of good depth, overlying a gravel subsoil which insures excellent drainage, and is devoted to the production of apples, cherries, seed peas, garden truck, hay, grain, poultry, sheep, beef, and dairy products. The famous McIntosh Red Apple and other fruits are grown and packed in this district and bring top market prices in New York and other eastern centers. Thirty-six per cent of area cultivated this year is in orchard. There are four creameries, three cheese factories, two canneries and a pre-cooling plant in the valley towns of the district.

The gross area of the district is 25,648 acres, of which 19,084 acres are irrigable. Area heretofore cultivated is 17,500 acres.

During the years 1923-1924 a \$600,000 bond issue was sold and the bonded debt is \$23.85 (per irrigable acre—\$31.44). The assessed valuation is nearly three times the bonded debt. The annual charge for interest and retirement of principal, per irrigable acre for the years 1924 to 1927, is \$1.89 and for the years 1928 to 1952 is \$2.44. To this should be added the cost of operation and maintenance of \$1.00 per acre. All interest payments, to date, have been met.

The \$600,000 bond issue was used for an extensive reconstruction program completed during 1923-1924, at which time the system and water rights of the district were approved by, and plans and specifications for improvements to the system prepared by Mr. A. J. Wiley, consulting hydraulic engineer of Boise, Idaho, a nationally recognized authority in this class of work.

The reconstruction work consisted of a most permanent type; concrete, steel and earth embankments. About 32 flumes were replaced by earth embankments, the remaining flumes being thoroughly repaired and new ends constructed. At all pipe lines, reinforced concrete intakes and outlets and piers were constructed, a modern steel wasteway installed at the Como Reservoir. Concrete wasteways and syphons were constructed at the East Side creek crossings and new concrete and steel turnouts for the main canal bank, as well as overhauling of the lateral system.

The main source of water supply is Rock Creek, which drains an area of 57 square miles of the Bitter Root Mountains and which is regulated for the district use by a reservoir at Lake Como. The water supply is ample and the district's water rights thereto are undisputable. The system has been in continuous use since 1910. Four acre feet of water are available for each acre of land irrigated.

The district was originally organized as the Water User's Organization and petitioned the court for creation of a district, which was granted in December, 1920. The bonds were issued under Sections 7166 to 7364, 1921 codes, of the State Irrigation Law. The validity of the State Irrigation Law has been established by State Supreme Court decisions.

There are 209 tracts improved with buildings; 3,387 acres of bearing orchard and 3,752 acres of alfalfa and clover; 1931 acres in pasture; 2,597 acres in grain; 745 acres in peas, and 330 acres in garden truck and potatoes. There are 471 land owners in the District, of which 80 are resident land owners. The average number of days between killing frosts is 130.

The district has been farmed for 14 years and the buildings and improvements are permanent. The assessed valuation of district lands is \$1,607,727 and the estimated real value is \$3,154,650.

Transportation and Highways: The highways of the county are the Park-to-Park, running north and south, the Skalkaho road crossing the Divide east of Hamilton to Anaconda and Butte. The Salmon-Bitter Root road, begun last year and leading from Montana into Idaho on the southwest, will be completed by fall. The Skalkaho will not be in order before June 1, and is a summer road. A daily stage carries passengers to Anaconda and connects with Butte stages there. Two daily stages for passengers operate between Missoula and Hamilton. There is a daily passenger service over the Bitter Root branch of the Northern Pacific. A tri-weekly freight service cares for the shipping over the railroad and a freight truck line operates daily between Missoula and Hamilton.

Education: There are five second-class school districts; four of the districts being consolidated. They are Darby, Hamilton, Corvallis, Victor. Stevensville is not consolidated, but is in this class. Florence-Carlton, a consolidated district at the north end of the county, is third class. There are 20 rural schools, some of which have followed the example of their larger contemporaries and consolidated in a small way. There are six fully accredited high schools in the county, each of the districts of the larger towns maintaining a high standard of education for the advanced pupils. School busses make it possible for easy attendance from the ranch homes of children in the consolidated districts.

Cities and Towns: Hamilton, the county seat, is the largest city in the county. Stevensville, farther down the valley, is the center of the dairying industry. The above two places have canneries which care for the sour cherry crop. Other towns are Corvallis, Victor, and Darby. Cheese manufacture is expanding, with factories at Corvallis, two at Stevensville and a fourth at Victor for the production of Swiss cheese.

Additional Information: For more detailed information about the resources of Ravalli County write to Hamilton Chamber of Commerce, Hamilton, Montana.

GRANITE COUNTY

Date of Creation	March 2, 1893	Land Area	1,728 Square Miles
County Seat	Philipsburg	Population County, 1920	4,167
Altitude County Seat	5,175 feet	Population County Seat, 1920	1,500
Growing Season			60-80 Days



SMALL in area and population, Granite County is unusually well diversified in industrial as well as agricultural resources. Lying in the middle western part of Montana, most of its territory is mountainous. The Continental Divide crosses its southeastern border and a spur of the Rocky Mountains defines its western boundary line.

Surface and Soil: The agricultural areas of Granite County are largely confined to the Flint and Rock Creek Valleys and to the Hell Gate River Valley. High mountains protect these valleys, which are among the most fertile in the state. The soil is alluvial, rich and deep.

Crops: The principal crops are oats, wheat, barley, flax, alfalfa, timothy, clover and all garden vegetables. The annual livestock production equals that of agriculture, as does also the metal production.

Drainage and Water Supply: Rock Creek and Flint Creek, rising in the high mountains in the southern end of the county, empty into the Hell Gate River, which runs westerly through the northern end of the county. These streams have many small tributaries.

Industries: Mining is the principal industry. The sapphire mines on Rock Creek are reputed to be the largest in the world. Other industries are agriculture and stock raising; also lumbering on a small scale.

Mineral Resources: Silver and manganese are the principal minerals. Gold, zinc, lead, copper and lignite coal are also produced commercially. There is also reported to be platinum, corundum, phosphate, and deposits of brick clay in the county, but their commercial importance has not been determined.

Timber: There are large stands of commercial timber. In addition to large private holdings, portions of the Deer Lodge National Forest and the Missoula National Forest are included within the county.

Land Values: Improved irrigated land ranges in price from \$40 to \$75 an acre; unimproved irrigated land \$15 to \$30, and unimproved non-irrigated land from \$8 to \$15 an acre.

Transportation and Highways: The main lines of the Northern Pacific and the Chicago, Milwaukee & St. Paul cross the county near the northern border, and a branch of the Northern Pacific runs up Flint Creek to Philipsburg. The Yellowstone Trail parallels the railroads. There is a main east and west highway through the county.

Education: There are 19 schools with a total enrollment of 688.

Cities and Towns: Philipsburg, the county seat, is the largest and most modern town and situated in the mining district. Hall, in the northern part, lies in one of the most fertile agricultural districts. Drummond, the junction point of the Northern Pacific branch to Philipsburg, is the trading center for the northern section of the county.

NORTH EASTERN MONTANA



Ranks First in Wheat and Oats—Little Irrigated Land Outside of the Milk River Valley and Fort Peck Reservation—Tendency to Abandon the One-Crop System.



North Eastern Montana is more nearly exclusively agricultural in character than any other district in the state. Daniels, Sheridan and Roosevelt counties, which occupy the eastern part, aside from coal mining, are devoted almost wholly to farming. Most of the land south of the Milk River, in Phillips and Valley counties, which occupy the western part, is devoted to stockraising.

Non-irrigated farming predominates, there being practically no irrigated lands outside of the Milk River valley and the old Fort Peck Indian reservation. Both of these are government projects. Reclamation has proceeded faster than settlement and development in the Milk River valley, the lands of which have been devoted chiefly to native hay and operated in units so large as to preclude diversified farming, though well adapted to it. In the past year or two a movement has developed to reduce the size of the units and bring in farmers.

Production on non-irrigated land in the three eastern counties makes this the banner wheat producing district. It is first in oats. Scobey, in Daniels county, lays claim to being the largest primary wheat market in the world.

DANIELS COUNTY

Date of Creation	May 11, 1920	County Seat	Scobey
Land Area	1,422 square miles	Estimated County Population, 1923	15,480
Altitude County Seat	2,150 feet	Population County Seat, 1923	1,170
Growing Season	110 days		

By A. W. Warden.

D

DANIELS County is located in the northeastern part of Montana, lying between Fort Peck Indian Reservation on the south and the Canadian line on the north. It roughly includes an area of 51 townships of very fertile territory devoted almost exclusively to grain and live stock production. Though small in area, Daniels County produces a vast amount of grain for shipment, and for the past four years, 1922 to 1925, Scobey, the county seat, has held the record of shipping more grain than any other primary shipping point in the United States. This area was formerly a range county. Following 1910, when the territory was thrown open for homesteading, it was rapidly settled and has been converted into an important grain raising section.

Surface and Soil: The surface of Daniels County is level to gently rolling with few areas too rough for profitable farming. The soil varies from a heavy glacial deposit to the lighter phases of sandy loam, which are found upon higher benches. In the glacial areas, Niggerheads and Granite boulders are mixed with the surface soil. All types of soil produce grain crops successfully.

Crops: Wheat, flax, rye, oats, and barley are the main crops grown. Of these, wheat furnishes practically 75 per cent of the cash income. Flax has been grown extensively on the newly broken sod, but is now being grown on older land with very good results. For feed crops, oats and barley are very dependable and give a high quality of feed. Corn of all kinds, and especially the Flint



on older land with very good results. For feed crops, oats and barley are very dependable and give a high quality of feed. Corn of all kinds, and especially the Flint

varieties, is grown successfully for hog feeding. Alfalfa, sweet clover, brome grass, and rye grass are used extensively for domestic hay and pasture.

Drainage and Water Supply: Daniels County is drained by the Poplar River and its tributaries, except for a small area in the eastern part of Daniels County which drains into the Big Muddy. Ample water for stock is supplied by streams. Water for domestic use is readily supplied by wells from 20 to 150 feet in depth. Most of the water is of very good quality and little difficulty is experienced in locating wells in any section of the county.

Industries: Agriculture is the principal industry of the county. One of the large oil companies has a compounding plant and distributing station located at Scobey.

Mineral Resources: Thousands of acres of Daniels County are underlain with lignite coal which is mined at depths from 5 to 120 feet.

Land Values: Land in this county can be bought at very reasonable prices. Well improved tracts 10 to 15 miles from town can be secured at \$20 an acre and up. A vast acreage of State land in the western part of the county is available for sale at the State land sales held every two or three years.

Transportation and Highways: Railways touching Daniels County include the Great Northern and the Soo lines. Whitetail, in the northeastern part of the county, is the terminus of the Soo. Scobey, the county seat, has been the terminus of the Great Northern for ten years. At present this branch is being extended to Opheim, in the county west of Daniels. A good system of highways is being constructed as finances permit. All of the main roads of the county are graded and attention is being given to less important roads. State highway specifications are being followed in all construction work.

Education: A very efficient system of district schools is maintained in the rural sections and graded schools maintained in Whitetail, Flaxville, Madoc, and Scobey. All towns in the county maintain at least the first two grades of high school work. There are 45 schools in the county with an enrollment of 1,347.

Cities and Towns: Scobey, Whitetail, and Flaxville are the principal towns. Other towns are Peerless, Madoc, and Navajo. As the county develops along the Scobey-Opheim extension of the Great Northern new towns will be built at Four Buttes and West Fork.

Additional Information: For more detailed information about the resources of Daniels County write to the Secretary of the Commercial Club, or the County Agent, Scobey, Montana.

SHERIDAN COUNTY

Date of Creation.....	March 27, 1913	Estimated County Population, 1925.....	13,000
Land Area.....	1,567 sq. miles	Population, 1920	13,847
County Seat.....	Plentywood	Population County Seat, 1920.....	888
Altitude County Seat.....	2,046 feet	Growing Season.....	98-106 days

By T. W. Greer.

E



EARLY history of this territory dates back to the Lewis and Clark expedition to the Northwest in 1804-6, and the main industry followed was hunting and trapping. With the building of railroads in 1882-88 stock raising became the chief industry. About 1908 settlement of the public lands began. The greatest influx of settlers came after the year 1910. In 1910 to 1913 two railroads were built through the county, one extending from Bainville and making a wide detour through the northern part of the county; the other was built through the northern part of the county. Few counties in the State have experienced a more rapid development. There are no mountains in Sheridan county and three-fourths of the land is tillable.

Surface and Soil: The soil of Sheridan County is of glacier origin which covers the county to about an average depth of 20 feet. This glacial drift lies upon the eroded surface of the Fort Union geological formation from which a supply of lignite coal is obtained. The largest part of the soil, which is classified as Williams loam, is very easily worked into a friable condition, contains a large amount of organic matter and is very productive. The water-holding capacity of the soil is good.

Drainage and Water Supply: Sheridan County is drained by the Big Muddy River and its tributaries. The county is well covered with streams which will easily drain any surplus water. Good water can be obtained at a depth of 15

to 150 feet.

Industries: The chief industries of Sheridan County at the present time are the raising of grain crops and stock raising. In the last few years dairying has become quite important, experienced Eastern dairy farmers finding that they can raise more feed and cheaper feed on our productive, low priced land and place their products on the

consumer's market more economically than they can when operating Eastern farms. Poultry raising, hog raising, and bee keeping are also becoming of increasing importance.

Mineral Resources: Practically the entire county is underlain with deposits of lignite coal. There are also large deposits of pottery, brick and tile clay of exceptional quality; strong indications of oil and gas and large deposits of aluminum, clay, silica, and thorium.

Land Values: Land values range from \$50 an acre for choice, favorably located agricultural land to \$5 an acre for lands suitable for grazing.

Transportation and Highways: Two railroad lines give daily service throughout Sheridan county. There is also a good system of graded roads netting its area and additional graded roads are being built at the rate of approximately 150 miles per year.

Education: There are 93 schools in the county, including seven approved high schools, employing 141 teachers and having an enrollment of 2,695 pupils.

Cities and Towns: There are five incorporated towns and ten unincorporated villages or towns furnishing railroad accommodations and markets to the inhabitants.

Climatological: The normal precipitation is in the neighborhood of 17 inches per year. However, about 60 per cent of it is received during the growing season from April 1 to August 1. There are very rarely extreme weather conditions either in winter or summer.

Additional Information: For more detailed information about the resources of Sheridan County write to the Secretary of the Commercial Club, Plentywood, Montana.

VALLEY COUNTY

Date of Creation.....	1893	Estimated County Population, 1925.....	12,000
Land Area.....	5,063 sq. miles	Population, 1920	10,500
County Seat.....	Glasgow	Population County Seat, 1920.....	2,059
Altitude County Seat.....	2,088 feet	Growing Season.....	May 20 to Sept. 10

By Samuel L. Rugg.



O

NE OF the largest counties of the State in area, Valley County is making rapid progress along agricultural lines. The county reaches from the Canadian border on the north to the Missouri River, a maximum distance of 100 miles. It is about 65 miles wide. A considerable acreage of irrigated land is still idle and projects under construction will more than double the amount of land now under water.

Surface and Soil: Aside from the bottom lands along the Missouri River that part of the county north of the Missouri and south of the Milk River is almost too rough and cut up by badlands to be adapted to anything but stock raising. The irrigated lands under the projects now in the course of construction lie almost wholly within the Milk River Valley and west of the confluence of the Milk and the Missouri along the Milk River. Soil types vary from silt and clay loams in the bottoms, to sandy and gravelly loams on the uplands. The well drained clays and clay loams which cover the greater part of the irrigated areas are the most fertile soil.

Crops: Due to the wide range of soil types and large acreage of both irrigated and bench lands, the crops of wheat, oats, flax, barley, and corn, alfalfa, potatoes, and beans are sought by outside agencies for seed purposes, the quality of these crops being exceptionally high. Much attention is also being given to dairying.

Drainage and Water Supply: The Missouri River, the Milk River and tributaries provide adequate water for all purposes.

Industries: Diversified farming and the raising of live stock are the principal industries of the county. A co-operative creamery has been established at Glasgow. There are also two flour mills.

Mineral Resources: Coal is found in some parts of the county and also brick clay. Drilling for oil is now under way.

Timber: There is no commercial timber in the county. Cottonwoods are found along the rivers and streams.

Land Values: Improved irrigated lands, \$40 to \$65 an acre; improved non-irrigated land, \$20 to \$40 an acre; non-improved cultivable lands, \$15 to \$35 an acre, and grazing land, \$8 to \$12 an acre.

Transportation and Highways: The main line of the Great Northern follows the Milk River Valley through the county. Auto stages run from Glasgow north. The Theodore Roosevelt Highway passes through the county, following the railroad. Graded roads extend from Glasgow to the Canadian line.

Education: There are 112 schools in the county, including four high schools. The total enrollment is 2,708.

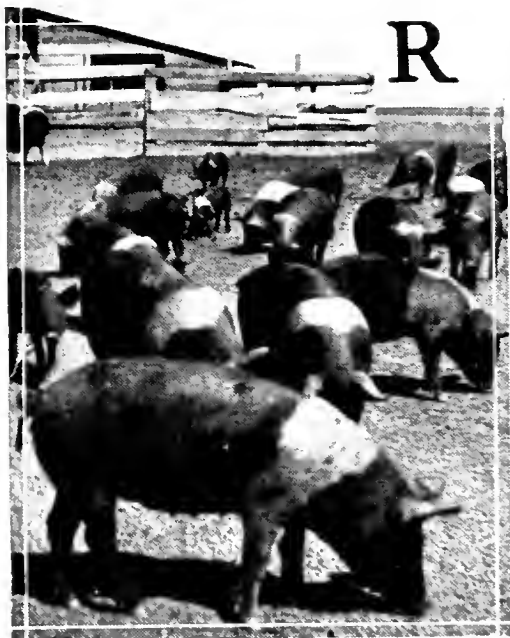
Cities and Towns: Glasgow, the county seat, is the largest town in northeastern Montana. It has all modern municipal improvements. Other towns are Oswego, Frazer, Nashua, Hinsdale on the Great Northern Railway, and Opheim and Glentana, 55 miles north of Glasgow, on the Great Northern branch.

Additional Information: For more detailed information about the resources of Valley County write to Secretary of Chamber of Commerce, Glasgow, Montana.

ROOSEVELT COUNTY

Date of Creation	February 18, 1919	Estimated County Population, 1926.....	12,250
Land Area.....	2,352 sq. miles	Population, 1920	10,347
County Seat.....	Wolf Point	Population County Seat, 1920...	2,098
Altitude County Seat	2,101 feet	Growing season	April to October

By Chas. Gordon and L. E. Jones.



ROOSEVELT County is 84 miles long and averages 25 miles wide. It lies in northwestern Montana. The North Dakota boundary marks its eastern, and the Missouri River its southern boundaries. It is exclusively an agricultural and stock raising county. While non-irrigated farming predominates over irrigated farming, when the Fort Peck Indian Reservation Reclamation Project in the western part of the county is completed by the government, 152,000 acres will be irrigated in one body. Its altitude is the lowest in the State.

Surface and Soil: A recent soil survey of Roosevelt County shows that there is a varying classification of soil on its rolling prairie glaciated formation; that 52% of the 1,505,920 acres is high class tillable land, while 48% is classified as grazing land of the better type. The soils consist of the sandy loam type in the eastern part and in the western and northern districts the sandy and clay loams prevail.

Crops: Fifty-two per cent of the 1,505,920 acres of Roosevelt County land area equalling 730,784 acres are tillable and productive land; of this 730,784 tillable acres, only 280,000 acres are under cultivation. Wheat and flax are the two main cash crops of the county. The corn acreage is from 16,000 to 18,000. The record shows that cattle, both beef and dairy, and hogs, are the main sources of revenue from live stock, there being

100% and 300% increase in those products, respectively, over a period of five years. The same record also shows that during the last five years there was an increase of 52 farms in the county, while all other adjoining counties showed a marked decrease in farm census.

Drainage and Water Supply: The Missouri River, forming the south boundary of the county, and its smaller tributaries, flowing in the general direction of northwest to southeast, constitute the drainage. These tributaries consist of the Poplar River, the Big Muddy, Wolf Creek, the Little Muddy, Little Wolf, Touley Creek, Shotgun and Sheep Creeks. The irrigation acreage approximately consists of 10,594 on the Poplar River, 4,394 acres on the Big Muddy partly completed, and two proposed areas of 83,588 acres called the Missouri River gravity and 10,000 acres called the Galpin bottom pumping.

Industries: Agriculture, consisting chiefly of live stock and crop production, are the main industries of the county. There is, however, one flour mill and bottling works at Wolf Point, creameries at Culbertson and Froid, and bakeries at Poplar, Culbertson, and Wolf Point.

Mineral Resources: There are many deposits of lignite coal throughout the entire county which furnishes a supply of fuel for practically all sources in the county. In addition, the geological survey credits this territory with having two oil domes in the west central and western portion of the county.

Timber: The main channel of the Missouri River, consisting of the whole Missouri River bottom, is heavily wooded and furnishes ample timber supply for all local uses.

Land Value: Land is valued from \$2.50 to \$40, depending entirely on its productive value and location. There are, however, thousands of acres of low priced land that have proven to be, under proper tillage methods, very productive. Experience records show that thousands of acres of \$5 land are producing an average of 25 bushels of wheat to the acre, under proper methods, over a period of four years.

Transportation and Highways: The main line of the Great Northern traverses the entire county and the branch line running to Scobey and Opheim bisect the eastern portion. The Roosevelt Highway runs approximately parallel to the Great Northern Railway. This is either graveled or plans for graveled will be completed in a few years. Forty miles of said project are already completed. The Powder River trail forms a north and south trail in the extreme west of the county, going through Wolf Point; the R-Y Trail in the west central portion traversing Poplar, and the Black and White

Trail in the east, traversing both Culbertson and Bainville, all lead into the R-Y Trails on the International Highway and join Canada National Highways on the north.

Education: Six modern high schools and ample public facilities in both town and rural communities put Roosevelt County on a high plane from an educational standpoint.

Cities and Towns: There are five main towns; namely, Wolf Point in the extreme west, Poplar in the west central part, Culbertson in the east central part, Bainville in the eastern portion, and Froid in the northeastern portion. Wolf Point is the county seat and division of the Great Northern Railway; Poplar is the headquarters of the Fort Peck Indian Reservation; Bainville is the junction of the main line and the Scooby branch, and all of these towns are active farm trading centers. In addition to these trading centers, the village of Mondak in the extreme east, McCabe in the east central, and Brockton in the south central form other trading centers that are of great value to farmers in marketing their products and buying supplies.

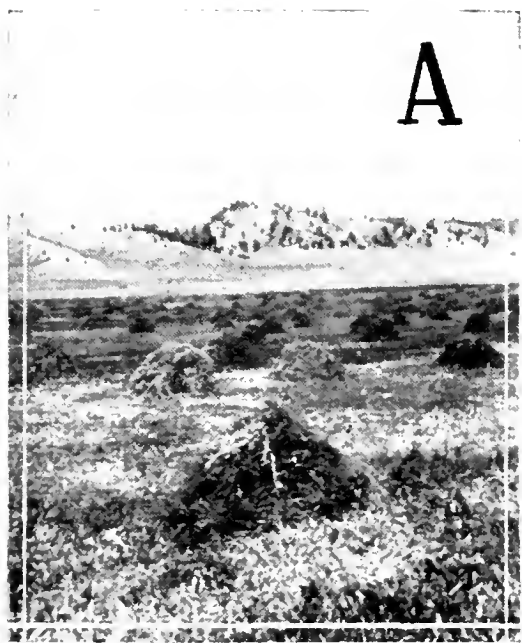
Climatological: Average precipitation, 14 inches; average frost-free period, 120 days; climate ideal for the production of high quality spring wheat and hardier seed crops as well as live stock and live stock products. A high percentage of corn has matured seven years out of the last nine and a fair percentage the other two years.

Additional Information: For more detailed information about the resources of Roosevelt County write to the Secretary, Commercial Club, Wolf Point, Montana.

PHILLIPS COUNTY

Date of Creation	February 5, 1915	Estimated County Population, 1925	9,000
Land Area	5,266 square miles	Population, 1920	9,760
County Seat	Malta	Population County Seat, 1920	1,427
Altitude County Seat	2,248 feet	Growing Season	119 days

By T. J. Larsen.



NEW COUNTY agriculturally, Phillips is making steady progress, and in time will no doubt prove to be one of the leading agricultural counties of the State. Extending from the Canadian boundary on the north to the Missouri River on the south, Phillips County lies in the north central part of Montana and is approximately 101 miles long north and south and 66 miles wide east and west.

Surface and Soil: The county is practically all prairie in character, with the exception of the Little Rocky Mountains in the southwestern part of the county. Soil types are quite uniform, varying from clay loams along the valley of the Milk River to sandy loams on the uplands. Much of the land in the south half of the county is rolling and broken, especially adapted to grazing purposes.

Crops: Wheat is the principal crop on the non-irrigated sections, and blue joint hay on the irrigated lands. Acreage devoted to corn is gradually increasing, while oats, flax, alfalfa, corn, beans and sugar beets are all profitable crops. The new sugar beet industry has brought in many new families from Idaho and Utah, who have permanently settled in the Milk River Valley. Alfalfa seed and seed potatoes are becoming an important factor in the growth of the county.

Drainage and Water Supply: The Milk River is the principal source of irrigation. Many tributaries rising in the Little Rockies flow into it from the south, and it is fed by many small streams from the north. Water for domestic purposes is obtained from wells.

Industries: Agriculture and stock raising are the principal industries. Sheep are raised on an extensive scale. Considerable gold mining is done in the Little Rockies.

Mineral Resources: The Little Rockies in Phillips County have produced gold and silver for many years. There are extensive lignite coal deposits in the county and some oil drilling has been done within the past two years, although oil in commercial quantities has not yet been produced.

Timber: In the southwestern part of the county is located the Jefferson National Forest in which some timber of commercial value is found. Cottonwood is also found along the Missouri and Milk Rivers.

Land Values: Improved irrigated lands sell for about \$75 per acre; improved non-irrigated for \$25, non-improved lands for \$15, and grazing land for \$10 per acre.

Transportation and Highways: The main line of the Great Northern passes through the county from east to west, following along the Milk River most of the way. The Theodore Roosevelt Highway parallels the Great Northern. Another important highway is the Dominion-Yellowstone Trail from Swift Current to Yellowstone National Park, via Malta and Lewistown.

Education: There are three accredited high schools in the county and 112 grade schools in which are employed a total of 146 teachers.

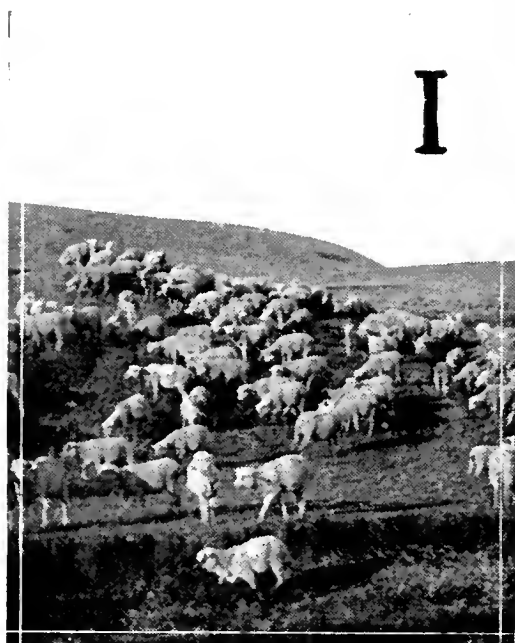
Cities and Towns: Malta, the county seat, is an up-to-date community and chief trading center. Other towns tributary to large farming districts are Bowdoin, Dodson, and Saco.

Additional Information: For more detailed information about the resources of Phillips County write to the Secretary of the Commercial Club, Malta, and the Secretary of the Commercial Club, Bowdoin, Montana.

BLAINE COUNTY

Date of Creation.....	March 2, 1912	Estimated County Population, 1925.....	10,000
Land Area.....	4,158 square miles	Population, 1920	9,500
County Seat	Chinook	Population County Seat, 1920.....	1,200
Altitude County Seat.....	2,400 feet	Growing Season.....	130 days

By E. J. McCabe.



IN THE heart of an extensive stock raising section, Blaine County is in the northern part of the State. The Milk River Valley extends from east to west, the entire width of the county, approximately 42 miles. On the south lies the Bear Paw Mountains which afford an abundance of range for sheep and cattle.

Surface and Soil: Generally rolling except valley lands and considerable bench lands which are level. Soil is well adapted to farming and consists of a loam on the benches and a sandy loam in the valley.

Crops: Hay, wheat, oats, barley, potatoes are grown successfully throughout the country; potatoes, 450 bushels to the acre; wheat as high as 55 bushels, and oats, 90 bushels.

A new industry was introduced into the Milk River Valley in 1925, being the raising of sugar beets. The Utah-Idaho Sugar Company built a beet sugar factory at Chinook in the summer of 1925, and approximately 5,000 acres of beets were raised for the factory run of 1925. This new industry is proving to be a great asset to the stock raiser as well as to the agricultural farmer.

Drainage and Water Supply: Water for irrigation is supplied from the Milk River, which is fed from St. Mary's Lake in the Rocky Mountains. Natural drainage systems exist, and with very little expense can be perfected.

Industries: Stock raising, general farming, dairying, creameries, flour mills, sugar beet factory.

Mineral Resources: Deposits of lignite coal are found in the hills on either side of the valley, which is shipped east and west on the Great Northern Railway.

Timber: Some timber borders along the Milk River, principally cottonwood.

Land Values: Bench lands are worth from \$5 to \$15 per acre; valley lands from \$25 to \$90 per acre.

Transportation and Highways: The main line of the Great Northern runs through the county from east to west. An improved gravel highway extends the entire width of the county through the heart of the Milk River Valley. Well graded dirt roads lead from north and south to the main highway.

Education: Harlem, Zurich, and Chinook have accredited high schools. Number of schools 83. Enrollment, 1,842.

Cities and Towns: Chinook, Harlem, and Zurich on the Great Northern Railway. Other unincorporated towns are Coburg, Savoy, and Lohman.

Climatological: The climate is well adapted to the industries of the county; warm summers and winters on an average are no more severe than in the central states.

Additional Information: For more detailed information about the resources of Blaine County write to the Secretary of the Commercial Club, Chinook, or the Secretary of the Commercial Club, Harlem, Montana.

NORTH CENTRAL MONTANA



*Farming, Stockraising, Oil and Coal Production Are the Chief Industries
—Eastern Half of the Glacier National Park on Western
Border—Most of the Area in Plains Region.*



Including within its area the eastern half of the Glacier National Park the North Central district stretches far eastward. Most of it is included within the plains region, but the western part and some isolated mountain ranges belong to the eastern slopes region.

The only irrigated district of any size in the eastern part is in the Milk River valley. There is considerable irrigated land in the western part, and the reclamation of more is projected. Non-irrigated farming predominates. Moisture has been the chief factor limiting crop production. Livestock is a more important source of wealth than crops. The district is new in a farming sense, however, and a type best adapted to it is being evolved. More settlers and smaller farm units are a need of most of the irrigated regions. Areas in the western and southern parts are naturally adapted to stockgrowing.

Spring wheat is the principal cash crop, in which the district ranks third. It leads in rye, and ranks well forward in hay, both tame and wild. Good results have been had with corn, except at the higher altitudes near the mountains.

HILL COUNTY

Date of Creation.....	February 28, 1912	Est. County Population, 1925.....	15,000
Land Area.....	2,892 sq. miles	Population, 1920	13,958
County Seat	Havre	Population County Seat, 1920.....	5,429
Altitude, County Seat.....	2,505 feet	Growing Season.....	130 Days

By W. F. Casey.



NE of the foremost counties of the State to show astonishing yields and unexcelled quality in wheat and other small grains. Previous to 1910 the area comprising Hill County was occupied almost exclusively by ranchers engaged in the business of raising range cattle, sheep and horses. The influx of settlers since that time has transformed the large ranch ranges into a comparatively well settled farming region, the principal crop being spring and winter wheat.

Diversification: After several years of farming of an experimental nature, a more diversified system now prevails and in addition to its wheat of high protein content and large yield per acre, Hill County is enjoying other sources of income such as that derived from dairying, hog raising, corn, cattle, and poultry.

Surface and Soil: Generally rolling with exception of areas in vicinity of the Bear Paw Mountains in the eastern end of the county and the territory adjacent to the Sweet Grass Mountains in the northwest corner. Soil has a loam composition and a deep rich sub-soil adapted to non-irrigated farming with an average rainfall.

Drainage and Water Supply: Water for irrigation is available from the Milk River which enters from the northwest corner and traverses the entire length of the county. No

project has been created in this portion of the county as yet but the United States Government has reserved the Chain of Lakes region, adjacent to the Milk River and north

of the town of Kremlin, as a reservoir for storing the waters of the Milk River in flood season. A project in the southwestern corner including an area of 200,000 acres has been under way for some time and will eventually furnish water in growing season sufficient to make certain an increased production of small grains.

Industries: General farming, stock raising, dairying, creameries, flour mills.

Mineral Resources: Coal, natural gas, brick and tile clay, and building stone. Gas has been discovered in quantities abundant to supply the city of Havre for lighting and heating purposes and development of a larger supply will follow as soon as the necessity arises for supplying manufacturing power.

Land Values: Benchlands from \$5.00 to \$20.00 per acre; valley lands from \$20.00 to \$75.00.

Transportation and Highways: The main line of the Great Northern runs through the county about midway between its north and south boundary. The Havre-Butte Division of the Great Northern runs in a southwesterly direction from Havre to Great Falls, Helena, and Butte. Highways have been improved and at present the projects completed furnish a hard surface road from the eastern line of the county to Havre, Kremlin, Gildford, and Hingham. The grade has been partly completed to extend the hard surface through the county to the towns of Rudyard and Inverness.

Education: Each of the towns named above have accredited high schools and standard grade schools. Rural schools are maintained in the outlying vicinities and are of high standard. Havre, the county seat, maintains an excellent high school in keeping with the population and requirements of the city.

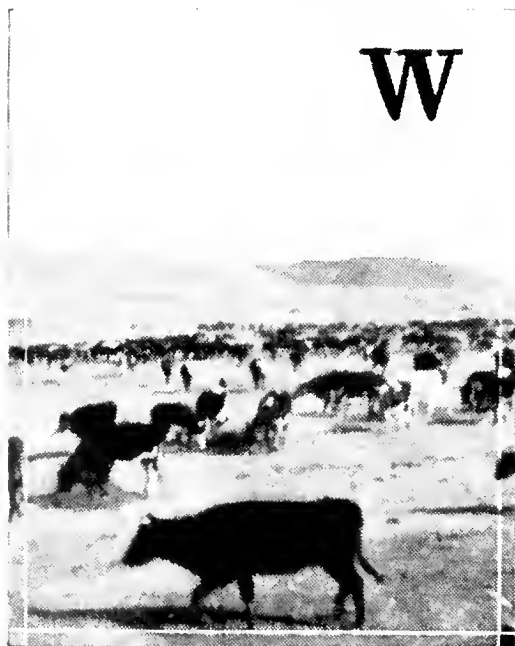
Climatological: Minimum temperatures are recorded in some years but little concern is shown by inhabitants due to dry mountain air and short duration of winter storms. The climate is well adapted to the industries; warm summers with long growing season and winters sufficiently mild to permit grazing of range cattle throughout the entire year.

Scenic Interest: The Bear Paw Mountains are of scenic as well as historic interest. A portion of the mountainous region adjacent to Beaver Creek has been established as a National Park and is fast becoming a summer playground. Fort Assiniboine located near in the foothills has in recent years been sold to the State of Montana and is now occupied by the Extension Department of the Montana State College as an experiment station.

Additional Information: For information on various parts of the country write Chamber of Commerce, Havre, or Farmers and Merchants Club, Kremlin, Montana.

GLACIER COUNTY

Date of Creation	April 1, 1919	Altitude County Seat.....	3,698 feet
Land Area	1,309 square miles	Population of County, 1925 (Est.).....	6,000
County Seat	Cut Bank	Population County Seat, 1925 (Est.).....	1,500
Growing Season.....			77-102 days.



W

HILE stock raising continues to be the leading industry of Glacier County, agriculture is rapidly becoming of importance. There are large areas of idle irrigated land in the county belonging to the Indians which can be leased or purchased at a low price.

Glacier County lies in north central Montana, the Canadian line defining its northern, and the crest of the main range of the Rocky Mountains its western boundary. It has the distinction of having within its borders Glacier National Park. Precipitous mountains occupy the western end and give way to plains sloping to the eastward, which are comparatively high in altitude. The region is well watered and the northern part, which is one of the best grass regions in the State, is ideally adapted to stock raising. The southern part of the county contains more level land and some good soil, and also has a longer growing season than the northern part.

Crops: The principal crop raised on the non-irrigated land is spring wheat, which, on account of its exceptional hardness, commands a fancy price. On the irrigated sections wheat is the principal crop, although all small grains, hay, alfalfa, and garden truck are profitable crops.

Drainage and Water Supply: Glacier is the only county in the United States which has drainage into three oceans. The waters from Triple Peak, in Glacier Park, flow into the Arctic, the Pacific, and the Atlantic Oceans, but most of the streams are tributaries of the Milk River, which, through the Missouri, finally empties into the Gulf of Mexico. There are three large irrigation projects in the county, and many private systems, providing irrigation for many thousands of acres of land.

Industries: The principal industries of the county are cattle and sheep raising, and agriculture. Dairying is rapidly coming into prominence, while the raising of hogs and poultry is proving a source of good revenue to the farmer.

Minerals: Coal has been found in the county, but only mined for local consumption. Magnetite beds, which can be traced for many miles across the reservation, are found in the western end of the county.

Timber: The Lewis and Clark National Forest occupies 25,000 acres in the south-western corner of the county.

Land Values: Lands are available throughout the county at prices ranging from \$5 to \$30 an acre. For the homeseeker of moderate means who wishes to make a change, there are many places that can be bought.

Transportation and Highways: The main line of the Great Northern runs through the county from east to west. A new State Highway, north and south, connects at Browning with the Roosevelt Memorial Highway and with the roads on the eastern side of Glacier Park.

Education: Glacier County has 14 schools, including one accredited high school, and a total enrollment of 1,046.

Cities and Towns: Cut Bank, the county seat, is a modern town in every respect, and the railroad and trading center for Glacier County. Browning, the oldest town, is located on the national highways and is known as "The Biggest Little Town in the State." Glacier Park is the official entrance to Glacier National Park. Its population during the winter months averages about 300, and varies during the summer season from 800 to 2,500 people. Babb is the gateway to Canada, and is destined to become of considerable importance.

Climatological: The average rainfall is about 16 inches per year, thus assuring a maximum crop production. The climate in Glacier County is especially good, with short winters and cool summer nights. It will be of interest to many to learn that the summer days are very long. At 4 o'clock in the morning it is practically daylight, and work can be done as late as 9 in the evening.

Additional Information: For more detailed information about the resources of Glacier County write to the Secretary, Cut Bank Commercial Club, Cut Bank, Montana.

CHOUTEAU COUNTY

Date of Creation.....	February 2, 1865	Altitude Prairie.....	2,900 to 3,200 feet
Land Area.....	4,062 sq. miles	Estimated County Population.....	8,000
County Seat.....	Fort Benton	Population County Seat.....	1,064
Altitude County Seat.....	2,600 feet	Growing Season.....	May 10 to Sept. 20

By G. C. Schmidt.

ORGANIZED in the year 1865, Chouteau originally contained almost 30,000 square miles. It was named after an intrepid Frenchman by the name of Pierre Chouteau, who was for many years President of the American Fur Company with headquarters at Fort Benton. The county as a whole is a rolling plain traversed by a mighty river and bordered on the south by the pine clad Highwood Mountains and on the northeast by the Bear Paw Mountains. It is a hunters' and fishers' Paradise. On the prairie may be found prairie chicken, sage hen, and the imported Hungarian partridge. In the mountains and brush land are also found the native pheasant, blue grouse, and the imported Chinese pheasant. Swarms of wild duck and geese are at times found on the prairie lakes and on the Missouri River. For many years the mountain streams have been stocked with trout fry so the ardent angler is always well repaid for his efforts. The Missouri is the habitat of pike, carp, buffalo fish, catfish, ling, and other desirable food fish.

Surface and Soil: The surface of Chouteau County is a gently rolling plain, divided into benches by the Missouri, Marias and Teton Rivers and smaller streams. The prairie is overlaid with 12 to 24 inches of chocolate clay loam soil with clay sub-soil. It is naturally covered by a luxuriant growth of the famous buffalo grass.

Crops: No. 1 dark hard winter and spring wheats are the principal crops. But in addition to this fancy wheat, the prairies of Chouteau County also successfully produce oats, flax, corn, and all root crops. Alfalfa on the irrigated bottoms and blue joint and timothy in the mountain valleys are the principal hay crops supplemented by grain crops that are cut for hay. With its 120 to 130 days of growing season, corn is rapidly becoming a popular and profitable crop. Sugar beets are successfully produced on the irrigated river and creek bottoms.

Drainage and Water Supply: The surface of Chouteau County is well drained by the Missouri, Teton and Marias Rivers and by the numerous smaller tributaries of the



Missouri—Highwood, Shonkin, Arrow, Big Sandy, Little Sandy, Eagle and Birch Creeks. These numerous streams originating in the mountains furnish every part of the county with a good supply of wonderful water. Parts of the Chouteau County prairie are becoming dotted with the wind mills of farmers who have successfully found underground water supplies.

Industries: The principal industry of Chouteau County is small grain farming, closely followed by the sheep and cattle industries. Many farmers successfully supplement their grain farming operations with dairying and raising of turkeys.

Mineral Resources: Large deposits of a good grade of lignite coal are found in the eastern and northern parts of the county. Crude oil has been found in counties adjacent to Chouteau County and this county has numerous promising structures which will be tested out by the drill point during the next few years.

Timber: A limited amount of timber, suitable for posts and firewood, may be found along the river and creek bottoms and in the mountainous areas of the southern and northeastern parts of the county.

Land Value: Good level and gently rolling prairie farms can be purchased at from \$12.50 to \$20 per acre, which includes in most cases fencing, some cultivation and small buildings. Farm land in more desirable sections and reasonably close to market, improved and unimproved, may be had from \$20 to \$35 per acre. It has been demonstrated more than once that one good crop will pay the entire cost of a farm.

Transportation and Highways: The head of navigation on the mighty Missouri River is at Fort Benton in Chouteau County, but river transportation has been very light since the advent of the railroad. Chouteau is traversed by the Great Northern and Milwaukee systems, so that the county is well supplied with rail and water transportation to the outside world. The public highway system is gradually being extended to all parts of the county with well graded dirt roads.

Education: The county is well supplied with good rural schools with modern high schools at Fort Benton, Geraldine, and Big Sandy. There is a public library at Fort Benton with branches throughout the county.

Cities and Towns: The cities and towns of the county are in comparative order of importance: Fort Benton, Big Sandy, Geraldine, Highwood, Square Butte, Carter, Loma, and Montague.

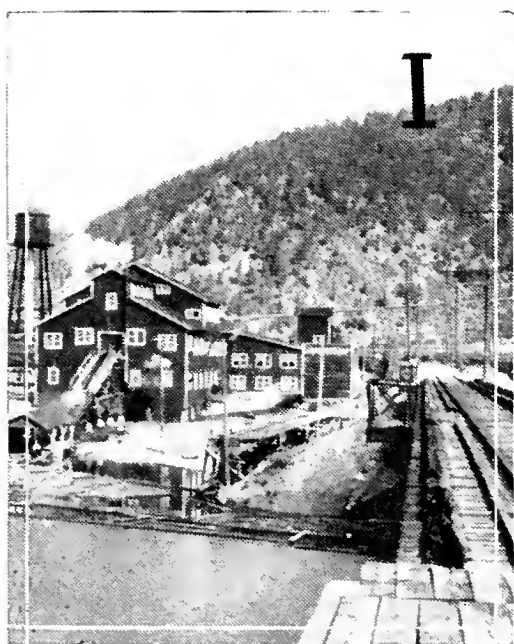
Climatological: Chouteau County is in the Chinook wind belt. The average winter temperature compares with central Iowa. Over one-half of its annual rainfall comes during the growing months of May to August.

Additional Information: For more detailed information about the resources of Chouteau County write to Chouteau County Development Association, Fort Benton, Montana.

PONDERA COUNTY

Date of Creation.....	April, 1919	Estimated County Population, 1925.....	
Land Area.....	1,658 sq. miles		5,500 to 6,000
County Seat.....	Conrad	Population, 1920.....	5,741
Altitude County Seat.....	3,500 feet	Population County Seat, 1920.....	988
Growing Season.....	122 days		

By M. L. Monley and William Wesley.



IN PONDERA County progress has been the history since its creation in 1919, until now it ranks with the oldest and most prosperous counties of the State. Its soil, altitude and topography permit an unusual variation in the types of agriculture. The Continental Divide of the Rocky Mountains forms the western boundary; this third of the county is devoted to stock raising. The central third centers around Valier, irrigated under the Carey Land Act, while the eastern third is devoted to non-irrigated farms.

Surface and Soil: The general surface of the agricultural portion of the county is composed of glacial drift ranging to 200 feet in depth, which gives a fairly uniform farming soil, ranging from chocolate brown clay loam to a sandy loam of rich and easy working qualities. The foot hills are admirably adapted to stock raising.

Crops: The principal grain crops grown on both the irrigated and non-irrigated lands are wheat, oats, barley, and flax. Corn is a profitable crop, and the acreage is being increased. Seed peas, beans, and sugar beets are special crops which give promise of becoming important producers. Alfalfa is the principal hay crop grown on irrigated lands.

Drainage and Water Supply: The Carey project at Valier has been constructed to serve 80,000 acres of land and water is available for this amount. The Blackfeet Indian irrigation project also extends into the northwest part of the county. Several good creeks flow from the mountains in an easterly and northerly direction, eventually emptying into the Marias River.

Industries: The establishment of a modern creamery at Williams has stimulated the dairying industry. The growing of turkeys and other poultry has become an unusually well developed industry in this county. Diversified farming and stock raising continue to be the leading industries.

Mineral Resources: Coal is mined for local consumption and some drilling for oil has been done.

Timber: There is a small amount of lodge-pole pine timber in the mountainous portions of the county.

Land Values: Irrigated lands sell at \$50 to \$100 an acre and the non-irrigated improved lands up to \$50; non-irrigated unimproved lands from \$10 an acre and up.

Transportation and Highways: The Great Northern and the Montana Western Railways provide adequate rail facilities. The Yellowstone-Glacier Highway, Custer Battlefield Highway and the Sunshine Trail all pass through the county, and good dirt roads connect these highways with all parts of the county.

Education: There are 47 schools in the county, including three high schools. The total enrollment is 1,372.

Cities and Towns: Conrad, the county seat, is the largest town in the county. Valier is a progressive town in the center of the irrigated area. Other towns are Dupuyer, the oldest town in the county; Brady, Williams, Manson, Ledger, and Fowler.

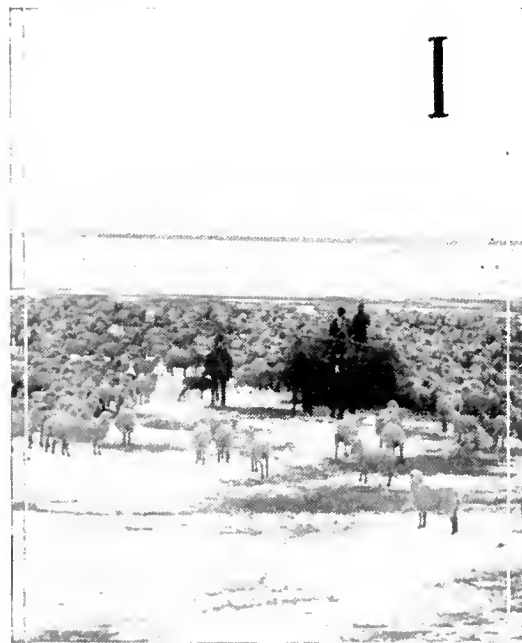
Climatological: Pondera has five seeding and growing months. The winters are mild and the summers not too warm for good growing conditions.

Additional Information: For more detailed information about the resources of Pondera County write to Secretary of the Commercial Club, Valier, or Secretary of the Commercial Club, Conrad, Montana.

TETON COUNTY

Date of Creation.....	March 1, 1893	Estimated County Population, 1925.....	6,000
Land Area (Approx.).....	2500 Square Miles	Population, 1920	5,870
County Seat	Choteau	Population County Seat, 1920.....	1,000
Altitude County Seat.....	3,800 feet	Growing Season.....	104 Days, Frost Free

By Robert Clarkson.



In the north central part of Montana, Teton County is located on the eastern slope of the Rocky Mountains. Part of the county embraces a section of this continental range. The average latitude is approximately 3800 feet. Its climate is what might be termed moderate, with an occasional cold spell during the winter months. The annual snow fall is comparatively light and seldom sufficient for sleighing. The summers are warm with cool nights.

Surface and Soil: The county includes thousands of acres of rolling lowlands and bench prairie, hills and mountains, with soils that vary from a rich dark loam to the poorest gravelly formations common to some of its higher sections.

Crops: Soils of Teton County have been found to be admirably adapted to the growth of small grains, particularly wheat. Nourishing grasses well suited for grazing of cattle and sheep, are abundant where land remains unbroken. Its irrigated areas are extremely well adapted to raising of alfalfa and sugar beets which have been found to thrive well in this territory. Great Northern beans could be made an important crop. The production of turkeys of high quality is an industry which has proved very successful, and the production trend is upward.

Drainage and Water Supply: Teton County is well supplied with good mountain water, having Sun River for its boundary on the south, and being traversed by Deep Creek, Teton River, Blackleaf Creek, and Spring Creek. These streams are fed by the snow-capped Rockies, which bound the county on the west, and give an abundant supply of water for municipal and irrigational purposes. There are three irrigation projects in the county comprising 150,000 acres of irrigated land. They are the Greenfield Bench, Burton Bench and Bynum.

Land Values: Land values in Teton County range from \$2.00 per acre to \$150 or \$200 per acre, depending upon location and quality. Good non-irrigated farms vary from \$10 to \$40 per acre, while in irrigated sections land values run from \$40 to \$200 per acre.

Transportation and Highways: Teton County is crossed by one main line and one branch line of the Great Northern railroad, and also has a branch line of the Chicago, Milwaukee and St. Paul railroad. These railroads give adequate transportation services to all sections of the county. Teton County also has a gravel highway running practically its entire width. The entire road from Great Falls to Choteau is gravelled and kept up in good shape. The county has also provided excellent roads in practically every section of the county.

Education: School facilities rank among the best in the state. There are 51 schools with a total enrollment of 1315. There is a high school at Choteau and a two-year high school at Power.

Cities and Towns: Choteau, the county seat, is an old established town. Other good towns and market centers along the Great Northern are Bynum, Pendroy, Power, Dutton and Collins; Fairfield, Farmington and Agawam are on the Milwaukee.

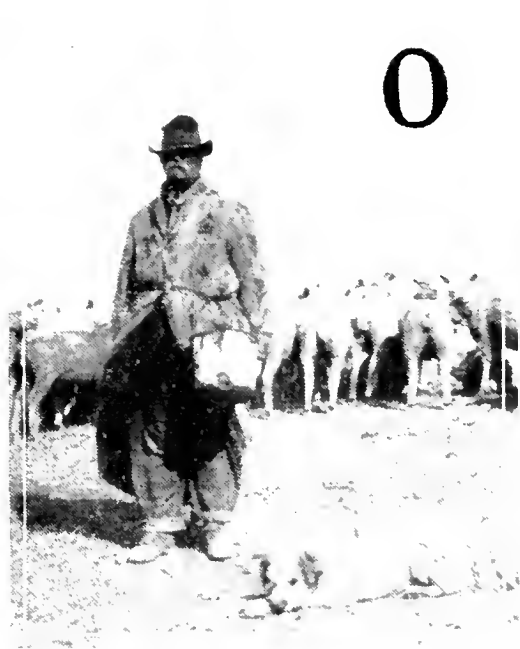
Climatological: The average frost free period in Teton County is approximately 104 days. Its precipitation average is about 14 inches per year, 61% of which comes in the growing season of April, May, June and July.

Additional Information: For more detailed information about the resources of Teton County, write to the Commercial Club, Choteau, Montana.

TOOLE COUNTY

Date of Creation	April, 1914	Estimated County Population, 1925	8,000
Land Area	1,949 Square Miles	Population, 1920	7,000
County Seat	Shelby	Population County Seat, 1920	1,200
Altitude County Seat	3,283 feet	Growing Season	93-106 Days

By W. B. Moser.



Oil production in the Kevin-Sunburst field, which lies about 20 miles north of Shelby and 15 miles south of the Canadian boundary in Toole County, has maintained second place in the Rocky Mountain States since May, 1925, being exceeded only by Salt Creek. The field is easily accessible, being crossed by a branch of the Great Northern Railway that leaves the main line at Shelby and runs north through Kevin, Sunburst and Sweet Grass. The total production of the Kevin-Sunburst field to January 1, 1926, was 2,513,000 barrels. The daily total production is 25,000 barrels. The extent of the exportation March 9, 1926, in the entire field may be summarized as follows:

Producing oil wells	447
Producing gas wells	33
Abandoned wells—on structure	210
Abandoned wells—off structure	37
Rigs up	22
Drilling wells	20
Validation holes	21

Total 790

There are at the present time three completed refineries in operation in the county. The International and the Snow Cap are located at Sunburst, and the Mount Giant located at Kevin. Progress is reported on the refinery to be built at Shelby.

To date, oil and not gas, has been the objective of exploration in the Kevin-Sunburst field, but even so, an important gas field has been found to exist on the south side of the dome and considerable quantities of gas are also being produced along with the oil from areas further north. Gas produced south of the oil field is now being used as domestic fuel in the city of Shelby, and in the field itself, gas is being used as fuel for drilling.

Toole county lies in north central Montana. It extends southward from the International boundary an average distance of fifty miles, and is about forty miles wide, east and west. Save for the northeastern quarter where the Sweet Grass hills, an isolated mountain range, arise, topography is rolling prairies and bench lands. The oil field lies in a treeless plain, bounded on the north and west by a bold escarpment that is capped by the formation known as the Virgelle sandstone.

Surface and Soil: Much of the surface of the field is covered by gravel and boulders, or by lake deposits, the result of the invasion of the area by glaciers. Soil types range from sandy and gravelly loams to heavier types of clay and heavy clay loams in the Marias River district in the southern part.

Crops: Spring wheat is the principal crop, followed by oats and tame hay. In the eastern and southern districts acclimated varieties of corn do fairly well and provide forage for livestock.

Drainage and Water Supply—The Marias is the only stream of any size. The city water supply for Shelby is piped seven miles from wells sunk along the banks of this stream. No permanent streams exist within the oil fields. Water for drilling is collected in reservoirs made by damming gullies and ravines, and water for domestic use is either collected in cisterns, or is brought in by rail. Nearly all the water obtained from the few shallow wells that have been sunk are too alkaline for domestic use.

Land Values: Land values vary greatly throughout the county. The ordinary types of unirrigated land is from \$5 to \$10 an acre, while in the oil fields some land is sold for as high as \$400 an acre.

Transportation and Highways: Transportation facilities are very good. The main line of the Great Northern crosses the county east and west. The Burlington-Great Northern line from the south connects with the main line at Shelby, and a branch line of the Great Northern runs north from Shelby to the Canadian border, where it con-

nects with the Canadian Pacific. The Roosevelt Highway follows the main line of the Great Northern and the Montana-Alberta Highway from Great Falls to Lethbridge parallels the railway north and south through the county.

Education: There are three high schools in the county located at Shelby, Sweet Grass and Galata.

Shelby has a fully organized accredited four year high school course. In September, 1925, there were 135 students registered in the high school and a total of 400 in the whole city school system. The high school includes departments in Normal Training, Commercial, Home Economics and College Preparatory. There are four school buildings in Shelby and plans are under way for a new building to take care of the rapid increase in enrollment. There are 53 schools in the county, including those mentioned, with a total enrollment of 1,178.

Cities and Towns: Shelby is the county seat and is an incorporated city with a population in the spring of 1926 of 2,500. It is the largest town, the headquarters for the oil industry and the principal distributing point for a large area. Shelby has experienced a phenomenal growth since oil was discovered. Three other incorporated towns are Kevin, Sunburst and Sweet Grass. Oilmont is a new town recently laid out in the heart of the oil field. Kevin and Sunburst are at present the largest towns in the field. Sweet Grass on the Canadian border, is a port of entry.

Additional Information: For more detailed information about the resources of Toole County, write to Shelby Commercial Club, Shelby, Montana.

LIBERTY COUNTY

Date of Creation	February 5, 1921	Estimated County Population, 1925	3,340
Land Area	1,158 sq. miles	Population, 1920	3,084
County Seat	Chester	Population County Seat, 1920	815
Altitude County Seat	3,139 feet	Growing Season	180 days

By W. H. Trumbull.

W

HILE Liberty County is one of the smallest counties in the state, containing 1,458 square miles, it is none the less important. It was formed from Hill, Toole and Chouteau Counties and lies in north central Montana, reaching to the international boundary line. In form it is oblong; 60 miles north and south by 24 miles east and west.

Surface and Soil: The soil consists of a volcanic ash deposit, which by action of the elements and time, has formed into alluvial and upland loam facings, with a deep, rich subsoil of life-giving adobe.

Crops: While the county is adapted to all grain crops, wheat is the principal one. Dwarf varieties of corn are preferred on account of their excellent yielding tendency in this altitude. Vegetables are grown in abundance without irrigation. Potatoes of excellent quality are easily produced. The native grasses are the Western Bluepoint and Buffalo Grass.

Drainage and Water Supply: In addition to the moisture furnished by the Marias River which flows easterly through the southern part of the county, water supply is found in the Cottonwood Creek and in reservoirs built of subsoil.

Industries: Agriculture and livestock are the chief occupations. Coal is also mined.

Mineral Resources: Oil and gas prospecting

is under way in several places in the western and northern portion of the county, and coal of good quality is produced for local consumption in the northern part.

Timber: The timber abounds only along streams or in valleys, but it is not of a merchantable character. Trees and shrubbery of adapted kinds are grown plentifully by exercising a slight amount of early care.

Land Values: Much naked land is to be had at \$12.00 per acre. An upward scale from this figure presupposes an amount of broken soil, other improvements, oil, gas and mineral rights, etc. Under present prices, \$15.00 will buy most desirable farm lands on very reasonable terms.

Transportation and Highways: The main line of the Great Northern crosses the county east and west and is paralleled by the Roosevelt (coast to coast) Highway.

Education: There are 31 schools, high schools being located at Chester, Lothair and Joplin. The total enrollment is 621. All laudable school activities are generously supported.

Cities and Towns: Chester, the county seat, is the largest community and the principal trading point. Lothair, Tiber and Joplin are other railroad towns, all containing grain elevators.

Climatological: Climate is tempered by surrounding mountains, and is ordinarily moderate and mild. Predominating rainfall is during the months of April, May and June. Cool nights in summer lend great virility to crop growing conditions.

Additional Information: For more detailed information about the resources of Liberty County, write to the Commercial Club, Lothair, Montana.



NORTH WESTERN MONTANA



Produces More Than Half the Lumber Cut of the State—In Undeveloped Horse Power Ranks First—Region Ideally Adapted to Dairying and Diversified Farming.



Lying on the Pacific slope side of the Rocky Mountains, and enjoying a climate that is tempered by its location, the North Western district is a region of possibilities in tourist attractions, diversified farming and electrical energy. In it are included Flathead, Lincoln, Lake and Sanders counties, and also the western half of the Glacier National Park. Though mountainous, many broad and fertile valleys are found, and in Lincoln county is found the lowest elevation above sea level in the state.

Lumbering is the principal industry, more than half the annual cut of the state being produced here. Considerable fruit is raised. Diversified farming is advancing with dairying as one of the major activities. Both non-irrigated and irrigated farming are followed. The largest body of irrigated land is in Flathead and Lake counties. In every county, however, irrigated lands are awaiting development. In Flathead, Lincoln and Sanders counties there are also large tracts of cut-over lands, which, when cleared, are adapted to agricultural purposes.

Some mining is done in the western part, and large deposits of good coal are reported in Flathead county, but the principal industrial resource is water power. In developed water power the district ranks second, but in undeveloped, first.

LINCOLN COUNTY

Date of Creation.....	July 1, 1909	Altitude County Seat.....	2,053 feet
Land Area.....	3,660 Square Miles	Population County Seat, 1920.....	7,797
County Seat	Libby	Population County Seat, 1920.....	1,522
Growing Season.....	46-97 Days		

N



ESTLED among the mountains in the extreme northwestern corner of the state, Lincoln County has the distinction of having the lowest elevation above sea level—1,800 feet—of any portion of Montana. This low altitude is found along the Kootenai River, according to the United State Geological Survey.

Lumbering and mining are the chief industries, although agriculture, and more especially dairying, are rapidly coming to the fore. The agricultural areas are limited, the only considerable body of open land being found in the Tobacco Plains valley, near Eureka, where more progress has been made in farming than in any other section of the county. The Kootenai valley is long and narrow and there are numerous benches lying between the river and the mountains, which must be cleared for farming operations.

Soil: In the Tobacco Plains Valley soil types range from sandy loam to glacial loam and clay, and on the bench lands are chiefly glacial loam. In other districts a black loam is found in the valleys, a light red volcanic ash, frequently underlain with gravel on the benches, while in places a gray loam occurs in both the valleys and on the benches.

Crops: Timothy and clover prove to be good crops, and splendid summer grazing is found on the national forests which occupy

two-thirds of the county. Apples, plums and small fruits do well in all localities. In

the western district pears and peaches are grown. Vegetables and root crops are produced in abundance.

Drainage and Water Supply: Lincoln is probably the best watered county in the state. The Kootenai River, which at times carries a larger volume of water than the Missouri, flows southerly more than half the length of the county, and then swings westward, covering 100 miles in all through the county. It is asserted there is a running stream in almost every gulch and more than 100 lakes, many of unusual beauty. Besides the Kootenai, the principal streams are the Tobacco River in the northeastern and the Yaak River in the western part. The undeveloped water power of the county is estimated at 31,000 horsepower, exclusive of many small developments.

Mineral Resources: The county has produced commercially, gold, silver, copper, lead and zinc. The United States Geological Survey, bulletin 384, pronounces the Lincoln County district, "a promising field for the prospector."

Timber: The Kootenai forest of 1,617,140 acres lies wholly within the county, and in addition there are 398,666 acres of the Blackfeet and 8,371 acres of the Cabinet National Forests within the county. Some of the largest saw mills in the state are located at Libby.

Land Values: Prices of land range from \$8 to \$90 an acre, depending upon character, location, amount of clearing done and its improvements.

Transportation and Highways: The main line of the Great Northern crosses the county east and west and a branch line runs from Rexford to the Fernie coal fields in British Columbia. The Theodore Roosevelt Highway parallels the railroad and serves the northern end of the county. The Park-to-Park Highway enters the county near the southwestern corner and swinging northwesterly, meets the Roosevelt Highway at Libby. The Scenic International Parks Highway, from Salt Lake to Banff and the Canadian National Parks, enters the county from the eastern side and at Eureka swings north to Gateway into Canada.

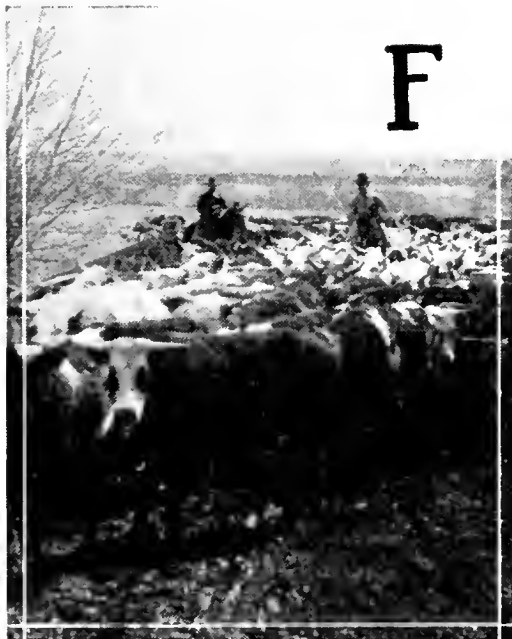
Education: There are 44 schools, including three high schools, with a total enrollment of 1,702.

Cities and Towns: Libby, the county seat, in the west central part, and Eureka in the northeastern corner, are the largest towns. Troy, with a population of 763, is a division point on the Great Northern. Warland is another of the industrial towns of the county.

FLATHEAD COUNTY

Date of Creation.....	About 1892	Estimated County Population, 1925.....	25,000
Land Area.....	3,600 square miles	Population, 1920.....	About 22,000
County Seat.....	Kalispell	Population County Seat.....	5,615
Altitude County Seat.....	2,959 feet	Growing Season.....	April 15 to Sept. 1

By Charles C. Baldwin.



FLATHEAD County is principally composed of the valleys of the Flathead River and its tributaries and has within its boundaries several large, well known and very beautiful lakes—Flathead, Whitefish and McDonald. The county is about 60 miles long, north and south, and will average about 60 miles in width. The main range of the Rocky Mountains border it on the east; lesser ranges are within the county. Glacier Park occupies 577 square miles of north-eastern Flathead county.

Surface and Soil: The level valleys are fine farm land, with a clay subsoil, some localities being sandy. Very little rock is found except in the mountains.

Crops: All kinds of grain, forage crops, potatoes, vegetables, and small fruits yield heavy crops. In fruit raising, Flathead is second in importance, apples, pears, cherries, plums, and berries being profitable crops. The sweet cherry is rapidly gaining prominence in this section of the State and production is increasing each year.

Drainage and Water Supply: Splendid drainage and numerous creeks provide irrigation for thousands of acres. In addition to the 1,600 developed horsepower, it is estimated that 12,000 additional horsepower can be developed on the Flathead River below the South Fork.

Drinking water is supplied from pure mountain steams.

Industries: Lumbering, farming, stock raising and dairying are the principal industries. Ideal conditions exist for manufacturing, there being a fine opening for a pulp and paper mill.

Mineral Resources: There is very little mineral in the county, with the exception of heavy coal deposits in the northeastern corner. The existence of copper and other minerals is reported. Pottery clay, also brick and fire clay deposits, are found.

Timber: Timber is the county's biggest natural resource. There are thousands of acres included in the national forests.

Land Values: Cut-over timber land, \$5 to \$30 per acre, and cleared land, \$50 to \$150 per acre.

Transportation and Highways: The main line of the Great Northern crosses the county east and west and a branch runs southwesterly from Columbia Falls to Somers, which is the head of navigation on Flathead Lake. Steamboats operate between Somers and Polson at the southern end, which is a terminus of a branch of the Northern Pacific. The Roosevelt Highway crosses the county east and west, and the western highway between Glacier and Yellowstone National Parks runs north through the county. Scenically, this is one of the most attractive regions in the country.

Education: Accredited high schools at Kalispell, Whitefish, Columbia Falls, and Polson. All schools in the county are graded and of a high standard. Number of schools, 68. Enrollment, 4,549.

Cities and Towns: Kalispell, the county seat, is the largest town and the chief trading center. Whitefish is a railroad division point. Other towns are Columbia Falls, Somers, Big Fork, Belton, Apgar, Coram, Creston, Essex, Kila, Lake Five, Marion, Lupfer, Mock, Nyack, Olney.

Climatological: Severe storms practically unknown. Average annual temperature about 42 degrees. Average annual rainfall about 17 inches. Average annual wind velocity 4.8 miles per hour. Average length of growing season about 148 days.

Additional Information: For more detailed information about the resources of Flathead County write to the Kalispell Chamber of Commerce, or the Whitefish Chamber of Commerce.

LAKE COUNTY

Date of Creation.....	August 10, 1923	Population of County (est.), 1925	15,000
Land Area.....	1,500 Square Miles	Population 1920	12,000
County Seat	Polson	Population County Seat.....	1,500
Altitude County Seat.....	2,908 feet	Growing Season.....	April 1 to Oct. 15

By M. M. Marcy.

H



HUNDREDS of thousands of undeveloped hydro-electric horse power, irrigated farms and considerable timber are among the assets of Lake County. The Flathead is the principal valley. It is a beautiful mountain valley of equable climate and exceptional fertility. It lies between the majestic Mission Range on the east with very little foothill area, and the Little Bitter Root Mountains on the west; is traversed generously by mountain streams which empty into the Flathead River, the outlet of Flathead Lake, which lies in the northern portion of Lake County. Flathead Lake is one of the largest inland lakes in the United States, outside of those embraced in the Great Lakes system. It is about thirty miles in length and from five to ten miles in width, with a rugged, wooded shore line of several hundred miles, pleasant and picturesque beaches, and dotted with villa sites reserved by the United States Government for sale as summer homes. Lake County embraces the greater portion of the widely known Flathead Indian Reservation.

Surface and Soil: The surface is gently rolling near the mountains, terminating in wide flats adequately drained, in the center of the valley. The soils vary; in parts rich loam, some sandy loams, but for the greater part clayey loam of high fertility.

Drainage and Water Supply: In this valley lies the Flathead Reservation Irrigation Project embracing 120,000 acres of irrigated lands. This project has been constructed by the Federal Government, is nearly completed and the cost of water right per acre is estimated at \$40 per acre in the Jocko division, and \$60 per acre on the remainder of the project, payable in 40 annual installments without interest.

Crops: Alfalfa, grains, clover, grasses and vegetables. Some corn is matured and dairying is becoming an important industry. There is considerable sheep raising in small flocks throughout the valley. Vegetables are grown in abundant yields. Potatoes raised in this valley and other crops are sought in many markets for seed purposes.

Industries: A saw mill at Polson with a daily output of 100,000 feet, several small mills; flour mills at Polson and Ronan; creamery at Polson and a projected cheese factory at Pablo. Extensive logging of tribal timber is conducted near Ronan and Arlee. Railroad operations.

Water Power: The United States Government will start the development of water power at the foot of Flathead Lake this year, proposing to develop a unit of 75,000 horse power. The site offers an economic development of 200,000 horse power.

Timber: One of the largest bodies of pulp timber in America is available to Flathead Lake and there are several billion feet of tribal and privately owned merchantable timber standing in Lake County.

Mineral Resources: Extensive oil leases outstanding; no important development up to the present.

Land Values: Irrigated lands range in price from \$35 to \$75 an acre; non-irrigated tillable lands from \$20 to \$25; grazing lands \$5 to \$10 an acre.

Cities and Towns: Polson, a city of 1500 people at the foot of Flathead Lake is the county seat and the terminal of the Flathead branch of the Northern Pacific Railway, running north from the main line at Dixon. Ronan is located in the center of the county, an important trading point in a prosperous farming community, population about 900. St. Ignatius with a population of about 700, is in the heart of a fertile farming section, the first settlement on the Flathead Reservation and the home of the Mission Fathers. Other towns conveniently spaced for trading are Rollins, Dayton, Big Arm, situated on the west shore of Flathead Lake; Pablo and Charlo are thriving towns in the center of irrigated lands; D'Aste, Ravalli and Arlee are also trading posts.

Transportation and Highways: The Flathead branch of the Northern Pacific, passenger busses daily through the Reservation, Missoula to Kalispell and return. Boat service on Flathead Lake, Polson to Somers. The Park-to-Park National Highway runs through the center of the county from Arlee on the south to Rollins on the north, touching nearly every town of importance in the county. All other highways in excellent condition.

Education: There are 41 schools, including high schools at Ronan, St. Ignatius, Arlee, Polson and Charlo. The total attendance is 2,011.

Scenic Advantages: The scenic advantages of Lake County are not excelled by those of any other county in Montana and the opportunities for the development of tourist resorts and hotels is unlimited.

Additional Information: For more detailed information about the resources of Lake County, write to M. M. Marey, or the President of the Kiwanis Club, Polson, Montana.

SANDERS COUNTY

Date of Creation.....	March 1, 1906	Population, 1920	3,949
Land Area.....	2,837 Square Miles	Population County Seat, 1920.....	508
Altitude County Seat.....	2,462 Feet	Grownig Season.....	111-132 Days

S



MALL in area but possessing important lumber resources, Sanders County occupies a part of west central Montana. The crest of the Coeur d'Alene defines its eastern and part of its southern boundary, while the Idaho line marks its western boundary.

Surface and Soil: The surface is mostly mountainous, with numerous narrow and fertile valleys. The soil types vary from a deep sandy loam to a white clay.

Crops: While small grains such as wheat, oats, barley, together with vegetables and fruit have been the chief crops, diversified farming together with dairying has been advancing in recent years.

Drainage and Water Supply: The Clark's Fork of the Columbia which flows through the county is fed by numerous tributaries rising in the Coeur d'Alene and Cabinet Mountains.

Industries: Though lumbering is of paramount importance, agriculture and dairying are fast coming to the front.

Mineral Resources: There are promising mining districts in the western end of the county, but development is largely in the prospective stage.

Timber: Over a million acres are included within national forests, including white pine, Douglas fir, cedar and larch.

Land Values: Land in the cut-over regions sell at from \$8 to \$15 an acre, while prices in prairie sections are from \$17 to \$85 per acre.

Transportation and Highways: The main line of the Northern Pacific follows the Clark's Fork of the Columbia through the County. The National Parks Highway and the Yellowstone Trail parallel the railway.

Education: There are 36 schools including rural, graded and three high schools, the combined enrollment being 1306.

Cities: Thompson Falls, the county seat, is the largest community. Plains, Perma and Dixon are important shipping points and Heron, Noxon, Trout Creek and Alger are trading points in the logged-off districts.

MONTANA LANDS



*Prices Low—Taxes Low—Production High—Cost of Production Low—
Yields High—Quality of Products Overcomes
Distance From Markets.*



In beginning a chapter on land it seems proper to mention that for the protection of the buying public, Montana has an advanced real estate law, affording genuine protection against misrepresentation by the unscrupulous broker.

Briefly the law requires that before one may legally engage in the real estate business in Montana he must first apply for a license, making application with the Division of Publicity and Real Estate, Department of Agriculture, Labor and Industry.

Before a license is granted the applicant must submit satisfactory references from at least 5 freeholders in his county certifying that they believe the applicant "to be a man of good moral character, and in their judgment well qualified to carry on the business of a Real Estate Broker."

In order that the public may be protected, a bond from each dealer in the sum of \$1,000 is required. When the bond and references have been approved the license is issued.

All bonded brokers are liable for misrepresentation to the full extent of their bonds. Upon the filing of a complaint by an aggrieved person the broker may be haled before the Commissioner of Real Estate and required to explain the alleged misrepresentation.

In buying from persons who represent themselves as real estate brokers, but who are not licensed and bonded by the State, the purchaser is not protected.

A list of all licensed and bonded dealers in real estate in Montana may be secured free of charge by making application to the Department of Agriculture, Labor and Industry, Helena.

The farmer in Montana has advantages and disadvantages. Disadvantages are distance from price making markets; lack of centers of large consuming population, and in many localities, lack of farming experience demonstrating the most efficient methods.

For example, lands in Montana are the lowest in the United States as the following table indicates:

AVERAGE VALUE OF PLOW LANDS PER ACRE, MARCH 1, 1916-1925

STATE	All Plow Lands				Poor Plow Lands	Good Plow Lands
	1916	1920	1924	1925	1925	1925
Montana	\$ 29.00	\$ 36.00	\$ 21.00	\$ 19.00	\$ 12.00	\$ 28.00
Illinois	115.00	170.00	120.00	123.00	82.00	153.00
Iowa	135.00	219.00	143.00	135.00	100.00	162.00
Minnesota	61.00	100.00	75.00	73.00	54.00	86.00
North Dakota	30.00	43.00	31.00	31.00	22.00	37.00
Nebraska	72.00	125.00	90.00	90.00	64.00	108.00
Washington	75.00	115.00	86.00	80.00	45.00	102.00
Idaho	53.00	105.00	68.00	68.00	44.00	90.00
United States Average.....	58.39	90.01	64.15	63.03	41.86	80.65

Land Taxes.

Tax on land in Montana is the lowest of any state in the Union except Arizona, according to figures compiled by the United States Department of Agriculture. Taxes in Montana on all lands have been reduced in 1925 from 16c per acre to 14.9c per acre according to the Montana State Board of Equalization.

The following table shows the tax per acre in the Northwestern states: Montana, 16c per acre; Wyoming, 39c per acre; Utah, 42c per acre; North Dakota, 63c per acre; Colorado, 68c per acre; Washington, 70c per acre; Oregon, 78c per acre; South Dakota, 80c per acre; Idaho, \$1.40 per acre.

Montana's tax on grazing, non-irrigated and irrigated lands is as follows:

	Non-Irrigated			
	Grazing	Farming	Irrigated	All Lands
Assessed Value	\$4.93	\$13.43	\$51.30	\$9.55
Tax Per Acre.....	.077	.21	.80	.149

Cost of Production.

The cost of producing wheat in Montana is lower than wheat production costs in North Dakota, Minnesota or Kansas, according to a survey made by the U. S. Bureau of Agricultural Economics for the 1923 crop which shows that Montana's net cost per bushel of wheat produced was \$1.09. Illinois and Iowa costs were lower than Montana. In the following table is shown a summary of the results obtained by the federal survey which covered 7,852 farms in 39 important wheat producing states. In the item of gross cost per acre as shown below are totalled the costs of preparation and planting, harvest and threshing, marketing, miscellaneous, commercial fertilizer, manure, seed, land rent and other miscellaneous costs. Credit is allowed from gross costs per acre for value of straw.

COST OF PRODUCING WHEAT

STATE	No. of Farms	Yield Per Acre	Gross Cost Per Acre	Net Cost Per Acre	Net Cost Per Bu.
Montana	283	16	\$18.32	\$17.48	\$1.09
North Dakota	411	9	12.98	12.66	1.41
Kansas	545	13	16.18	15.69	1.21
Minnesota	300	15	18.63	17.85	1.19
Iowa	194	19	20.80	19.65	1.03
Illinois	411	20	20.40	19.16	.96
Total of 39 States.....	7,852	17	22.88	21.02	1.24

Acre Yields.

The acre yield in Montana is high. Here is a table showing a comparison of specified crops in this and other states.

COMPARISON OF ACRE YIELDS OF SPECIFIED CROPS IN MONTANA AND OTHER STATES

	Wheat Bu. Per Acre Ave.*		Oats Bu. Per Acre Ave.*		Potatoes Bu. Per Acre Ave.*		Tame Hay Tons Per Acre Ave.†	
Montana	16.4	14.6	29.5	29.0	88	117	2.01	2.15
North Dakota.....	15.5	10.3	34.0	23.9	92	82	2.50	2.34
Minnesota	21.8	13.3	43.0	34.4	132	98	2.70	2.63
Iowa	20.2	18.0	43.0	38.9	136	79	3.05	2.49
Illinois	14.8	17.4	40.0	39.8	115	72	2.85	2.75
Kansas	16.3	14.4	26.0	27.9	95	70	2.42	2.28
United States.....	16.1	14.6	36.0	33.3	124.2	97.9	2.52	2.61

* Average is for period 1914-1920.
†Average is for period 1920-1924.

Quality.

Montana lands raise quality products. Quality pays. For example, Montana in 1926 still ranked first in the United States in the percentage of spring wheat grading number one, according to figures prepared for the Division of Publicity, Montana Department of Agriculture. Sixty-eight per cent of the state's spring wheat crop in 1925 graded number one; North Dakota ranked second, grading forty-nine per cent of the spring wheat number one.

During the past five years Montana has consistently led all other states except Wyoming by a fairly wide margin. Wyoming during this period tied with Montana in 1924.

The average farm wheat price in Montana for the four-year period 1921-24 was 96 cents, ranging from 86 cents in 1921 to \$1.23 in 1924. In North Dakota the price ranged from 86 cents to \$1.29, and averaged 98 cents. In South Dakota the range was from 83 cents to \$1.26, and averaged 96 cents. In Kansas the range was from 93 cents to \$1.27, and averaged \$1.02. In Minnesota the price ranged from 98 cents to \$1.32, with an average of \$1.06. When the average freight rate from these points to terminal markets is added to the farm price the figure for Montana wheat is \$1.26, North Dakota wheat, \$1.12; South Dakota wheat, \$1.10; Kansas wheat, \$1.13, and Minnesota wheat, \$1.14.

These advantages in a large measure throw in the discard Montana's distance from price-making markets.

Homestead Land.

The State of Montana has no jurisdiction over homestead lands. For detailed information concerning the homestead laws and regulations governing homesteads write the Commissioner of the General Land Office at Washington, D. C. Depending upon the character of the land, a person can take up 160 acres or 320 acres that have been designated as suitable only for dry farming or 640 acres designated as suitable only for grazing.

There is a little good land left in Montana that is open to homestead entry but it lies in most instances 40 miles to 100 miles from the railroad and the cost of marketing crops that distance would eat up all the profits. To make a success on such a farm a man would require livestock. The person that has the money with which to buy livestock could do better by leasing, renting or buying a farm closer to the railroad.

ACRE VALUES

(Average acre yield times farm price per bushel or ton)

CROP:	1925	1924	1923	5-Year Average (1920-24)
Spring Wheat.....	\$14.70	\$20.09	\$11.48	\$13.48
Winter Wheat.....	19.28	21.20	13.94	15.18
Corn	15.67	17.82	16.90	14.13
Oats	11.92	13.86	12.54	11.52
Barley	15.12	17.25	12.24	13.19
Rye	9.25	12.74	5.61	8.10
Flaxseed	9.90	19.22	15.83	12.16
Potatoes	172.80	76.56	71.50	81.19
Tame Hay.....	17.27	17.64	16.73	17.62
Wild Hay.....	8.10	8.10	7.28	7.60
Beans	38.12	39.60	42.55	.....

STATE LANDS



*Montana Has for School System State Land Assets Valued at \$75,600,000—
Grants Explained—Land For Sale.*



By L. M. Brandjord.

The splendid school system of Montana is assured of perpetual and constantly increasing support from the Federal lands granted to the State and through the income from the permanent funds derived from the sale of these lands and from other sources. The Federal land grants to Montana are as follows:

(a) Sections 16 and 36 of each township, and lands granted in lieu of such of these sections that have been lost to the State, for the support of the public schools, about.....	5,188,000 acres
(Section 10 of Enabling Act)	
(b) Grants for State University.....	46,720 acres
(Section 14 of Enabling Act grants 72 sections) ..	46,080 acres
Later Grants:	
Site for Observatory	480 acres
Biological Station	160 acres
Total	46,720 acres
(c) Grant for Agricultural College	140,000 acres
(Section 16 of Enabling Act).....	90,000 acres
(Section 17 of Enabling Act).....	50,000 acres
Total	140,000 acres
(e) Grant for State Normal Schools.....	100,000 acres
(Section 17 of Enabling Act)	
(e) Grant for State Normal Schools	100,000 acres
(Section 17 of Enabling Act)	
(f) Grant for State Reform School	50,000 acres
(Section 17 of Enabling Act)	
(g) Grant for Deaf and Dumb Asylum.....	50,000 acres
(Section 17 of Enabling Act)	
(h) Grants for Buildings at State Capitol.....	182,000 acres
(Section 12 of Enabling Act).....	32,000 acres
(Section 17 of Enabling Act).....	150,000 acres
Total	182,000 acres
(i) Militia Camp	640 acres
(j) At Fort Assiniboiné for Educational Purposes.....	2,000 acres
Total of all these grants	5,859,360 acres

The federal land grants constitute just about one-sixteenth of the entire state. Every settler coming to the state and becoming one of its citizens becomes a part owner of this vast estate and will receive his share of the benefits.

How This Estate Stands Today.

These lands were granted to the State for the purpose of creating permanent revenue funds for the support of education. This idea is carried out through our constitution and statutes. The lands are sold as demand develops, but the money realized from the sales is added to the permanent fund of the institution to which the land belongs. Only the interest on the money and the rentals from lands leased and other actual income are used for the support of the schools.

On January 1, 1926, the State carried investments belonging to the various permanent funds as follows:

Municipal bonds	\$ 7,137,645.79
General Fund State warrants	1,117,239.63
Farm mortgages	4,518,933.27
Cash balances	456,439.30
Total	\$13,260,257.99

In addition to these investments the State has millions represented by deferred payments on State lands sold and has between four and five million acres of lands still unsold. The estimated value of these lands and land contracts will bring the total value of these assets up to about \$75,000,000.00. During the year 1925 the income from the lands under lease, the interest on the investments and so on, yielded an income of more than \$1,000,000.00 to the public schools alone. The other educational institutions were similarly benefited.

Leasing of State Lands.

All State lands not under sales contract are open for lease. The lands may be leased either for grazing purposes or for agricultural purposes, in quantities not exceeding one section to each person and not for a longer time than five years. The annual agricultural rental is five per cent of the appraised value of the land, and as the average appraisal is less than \$15.00 per acre, this rental averages less than 75 cents per acre per annum. It will be admitted that these are very reasonable terms.

Lessees of State lands are protected in their labor and investment for improvements placed on these lands. If another person becomes the lessee of the land, or if the land is sold to some other person than the lessee, then the new lessee or purchaser must pay to the former lessee the reasonable value of all such improvements. If the owner of the improvements and other party cannot agree as to the value of these improvements, then the State Land Agent, or one of his deputies, will examine the improvements and fix the value. The owner of the improvements has the privilege of removing the same if he so desires. The business of leasing is handled through the office of the Register of State Lands, subject to the supervision of the State Board of Land Commissioners.

Sale of State Lands.

The State owns land in nearly every county in the State. Sections 16 and 36 in each township were granted for the support of the public schools and were therefore not subject to homestead entry. A great deal of the so-called lieu lands and of the lands granted for the higher educational institutions of the State was largely selected before the inrush of settlers. As a result the State of Montana owns some of the very best agricultural lands in the entire State.

With a few unimportant exceptions, State lands cannot be sold for less than \$10.00 per acre, and in no case for less than the appraised value, which is intended to represent the actual value. State lands are sold only at public auction after having been advertised four consecutive weeks beforehand. As a rule, these sales are held only when a considerable number of tracts can be sold in the same county at the same time.

In October of 1925, regular sales of State lands were held in Daniels County and in Valley County, situated in the northeastern part of the State. The result of these sales was as follows:

Total number of sales.....	274
Total number of acres sold.....	51,492.51
Total amount of all sales.....	\$719,622.06
Average price per acre.....	13.975

Special Sales.

In some cases, the State Board of Land Commissioners has ordered special sales to be held upon the application of a few persons who themselves were willing to defray the expenses of such sale. As a rule, a special sale of this kind costs less

than \$100.00, a considerable portion of the cost being the expense of advertising as provided by law. Special sales are not encouraged by the Board for the reason that they do not always develop competitive bidding and thereby bring out the actual market value of the land, which is the purpose of the public sales.

Terms of Sale.

State lands in Montana are sold on the most favorable terms possible. The purchaser is required to pay in cash on the date of sale only ten per cent of the purchase price. The remainder of the purchase price draws interest at the rate of only five per cent per annum and is payable on the Amortization plan through a period of thirty-three years. The annual payment amounts to six and one-fourth per cent of the balance unpaid after the original ten per cent payment. This pay-

SCHEDULE OF PRINCIPAL AND INTEREST PAYMENTS
Principal \$900.00. Interest Rate 5% Payable Annually.

No. of Payment	Total of Each Payment	Applied on Interest	Applied on Principal	Balance Principal Unpaid
1	\$56.25	\$45.00	\$11.25	\$888.75
2	56.25	44.44	11.81	876.94
3	56.25	43.85	12.40	864.54
4	56.25	43.23	13.02	851.52
5	56.25	42.58	13.67	837.85
6	56.25	41.89	14.36	823.49
7	56.25	41.17	15.08	808.41
8	56.25	40.42	15.83	792.58
9	56.25	39.63	16.62	775.96
10	56.25	38.80	17.45	758.51
11	56.25	37.92	18.33	740.18
12	56.25	37.01	19.24	720.94
13	56.25	36.05	20.20	700.74
14	56.25	35.04	21.21	679.53
15	56.25	33.98	22.27	657.26
16	56.25	32.86	23.39	633.87
17	56.25	31.69	24.56	609.31
18	56.25	30.46	25.79	583.52
19	56.25	29.18	27.07	556.45
20	56.25	27.82	28.43	528.02
21	56.25	26.40	29.85	498.17
22	56.25	24.91	31.34	466.83
23	56.25	23.34	32.91	433.92
24	56.25	21.70	34.55	399.37
25	56.25	19.97	36.28	363.09
26	56.25	18.15	38.10	324.99
27	56.25	16.25	40.00	284.99
28	56.25	14.25	42.00	242.99
29	56.25	12.15	44.10	198.89
30	56.25	9.94	46.31	152.58
31	56.25	7.63	48.62	103.96
32	56.25	5.20	51.05	52.91
33	55.55	2.64	52.91	.....
Totals	1,855.55	955.55	900.00	.....

ment of six and one-fourth per cent includes the interest charge of five per cent per annum and will entirely extinguish the principal during the thirty-three years. Supposing a man purchases eighty acres of State lands at a price of \$12.50 per acre. The total purchase price will be \$1,000.00. Of this he pays \$100.00 at the time of sale. This leaves a balance of \$900.00, which will require an annual payment of \$56.25. This amount takes care of the interest and will fully pay the principal during the thirty-three year amortization period, as shown by the following table:

Please note the evenness of the total payments, the continuous decrease in the part needed for interest, the constant increase in the part applied on principal, and the gradual dwindling away of the debt itself. The interest on \$900.00 for

thirty-three years at 5% would be \$1,485.00. The table shows that under the amortization plan you pay only \$955.55, an actual saving in interests of \$529.45. This saving in interest is automatically applied on the principal. Herein lies the seeming magic of the amortization system. The State of Montana feels that this is a very effective plan in helping purchasers of land and the tillers of the soil to become the actual owners thereof. Probably no state in the Union has more advantageous terms to offer to the purchasers of state lands.

Taxation of State Lands Sold.

The purchaser of State lands is subject to taxation only on his actual equity in such lands. The first year after its purchase he will be taxed on a 10% interest; during the second year his equity will be about 11%; during the third year it will be 12%; during the fourth year 14%, and so on. In this way the State is aiding the purchaser of its lands to the fullest possible extent in becoming its real owner, and in the building and establishment of the noblest institution on earth—Home Sweet Home.



General View of Washoe Reduction Works, Anaconda, Montana.

For Additional Information



A. H. BOWMAN.

In concluding a book of this kind it is perhaps fitting to close with the following from Montana's Commissioner of Agriculture, Labor and Industry:

The State Department of Agriculture will be glad to give you information bearing on Montana agriculture, climate, land values—any information that will help you get the kind of farm you want.

We can put you in contact with reliable business men and farmers in every community—men whom we have carefully selected who are entirely familiar with farming conditions. They will advise you regarding farming methods, help you get acquainted and aid you to get started right. We want you to take advantage of the free services of this department.

The pioneer stage is over and proven farming methods have been established in Montana. Farmers are rapidly demonstrating to other states the high germination, hardiness and superior yielding qualities of Montana seed. Seed corn, wheat, oats,

alfalfa, potatoes are in increasing demand in eastern and southern states, bringing us premium prices. Marketing associations are well organized to grade and market standard seed which assures a growing market.

Livestock shipping associations, poultry marketing organizations, cooperative creameries are handling livestock and dairy products. Over 600,000 pounds of Montana turkeys were placed on the eastern markets in 1924 by cooperative associations at a substantial profit to the farmers. Turkeys from this state have established a reputation for quality on the Chicago market and are in demand.

We would like to tell you more of the way Montana farmers have met the drop in farm prices. Cheaper production costs, quality products bringing premium prices have enabled them to produce at a profit and build permanent homes. These are our natural advantages.

The Department of Agriculture assures you full cooperation in getting dependable information. We hope you will feel free to write us. If you come here to live we want you to be successful. Address the Division of Publicity for additional information.

A. H. BOWMAN.

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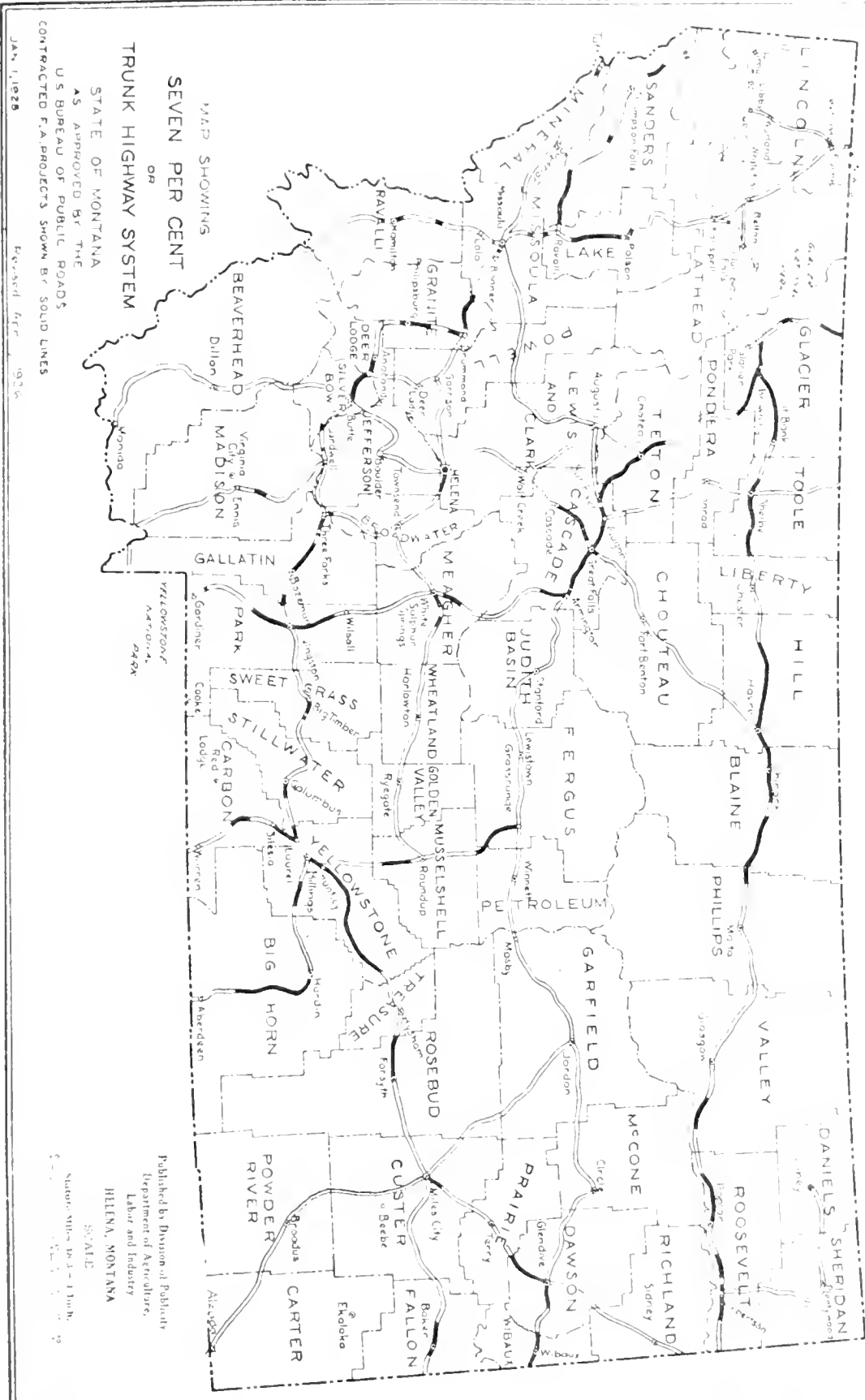
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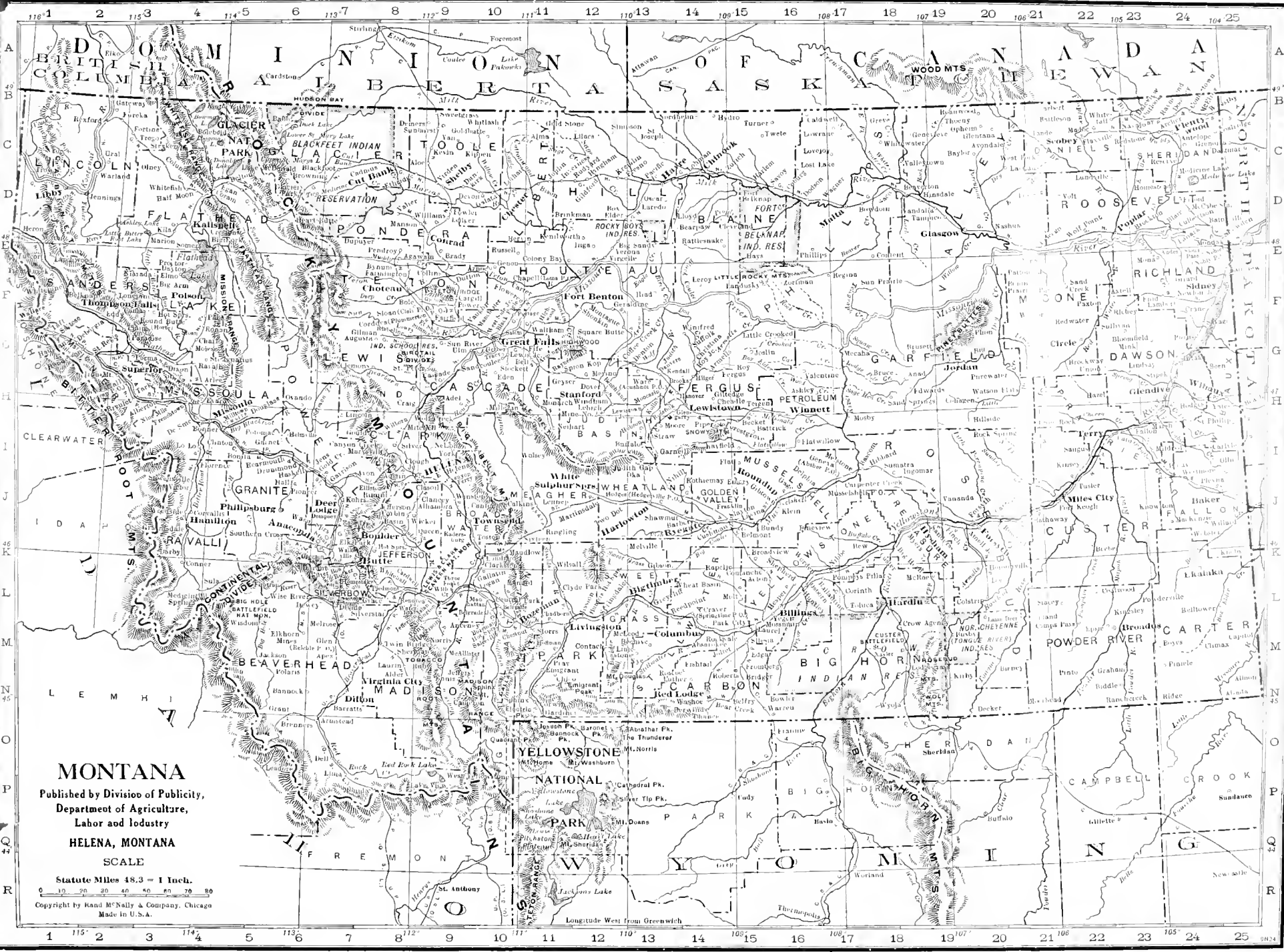
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MAP SHOWING
SEVEN PER CENT
OR
TRUNK HIGHWAY SYSTEM
STATE OF MONTANA
AS APPROVED BY THE
U.S. BUREAU OF PUBLIC ROADS
CONTRACTED F.A. PROJECTS SHOWN BY SOLID LINES

Published by Division of Publicity
Department of Agriculture,
Labor and Industry
HELENA, MONTANA
SCALE
NATIVE SIZE - 1 in. = 1 mi.
1 in. = 100 miles

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MONTANA

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HELENA, MONTANA

SCALE

Statute Miles 48.3 = 1 Inch.

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